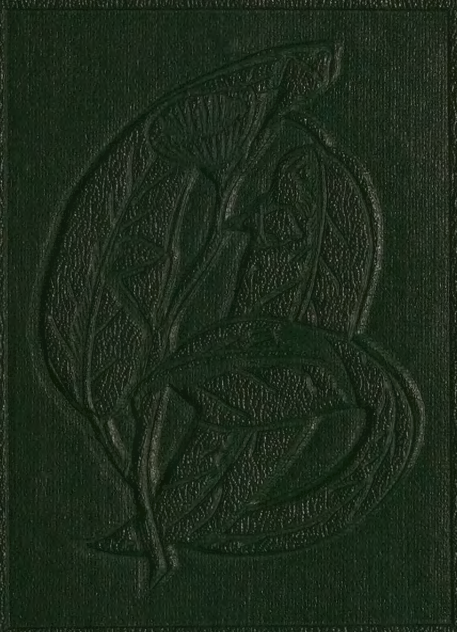

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AN ANTHOGRAPHY OF THE EUCALYPTS

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AN ANTHOGRAPHY OF THE EUCALYPTS

BY

RUSSELL GRIMWADE

B.Sc. (Melb.)

WITH 103 PLATES

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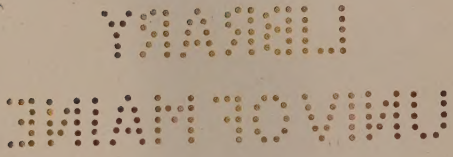


TO MY WIFE

103075

PREFACE

THIS book is intended to assist in the identification of species, to awaken fresh interest, to stimulate research, and to promote cultivation of the Eucalypts. If it attains these aims, and attracts more serious attention to the commercial and æsthetic value of our forests, its purpose will have been fulfilled. Horticulturists, farmers and "people on the land" generally, will, it is hoped, find guidance in selecting species for cultivation, whether for scenic, horticultural or utilitarian purposes.

To gain some personal insight into the grouping of Eucalypts the author undertook a series of photographic delineations. Practically all the species usually met with in Australia are illustrated and described, briefly, but with sufficient detail to facilitate their identification.

Amongst factors that contribute to a positive identification of species are habit, bark, leaves, leaf-stalks, timber, opercula, flowers, fruit and seedlings. All these must be reviewed to establish the identity of any specimen; in few cases, if any, can one factor alone be considered sufficient. Present-day analysis of the genus is comparative only, and every available character must be considered. It has not been possible to represent all the factors in these pictures; but an effort has been made to show leaves, unopened buds, flowers and fruit. Artistic effect has been subordinated to accuracy. The description given with each plate is intended to supplement the information conveyed by the photograph, as well as to supply clues to identify that cannot be recorded in a monochrome print. Emphasis is also laid on unmistakable and unique characteristics.

To Mr J. Cronin, Director of the Melbourne Botanic Gardens, by whose courtesy many specimens have been made available, the author pays appreciative tribute; and to many other lovers of our trees, who by their timely assistance in collecting specimens have made possible this compilation, grateful acknowledgment is made.

As for Mr P. R. H. St John, of the Melbourne Botanic Gardens, adequate recognition of his work is hardly possible. Under his willing tutelage one learns to admire an enthusiasm equalled only by his knowledge. No effort is unworthy, no sacrifice too great for him, if thereby he can advance the subject he knows so well and loves so dearly. Though it can never fully discharge the debt due to him, this measure of thanks is offered in return for many hours, days and years of happy interest.

RUSSELL GRIMWADE.

Melbourne,
August, 1920.

PREFACE TO SECOND EDITION

In this Second Edition of the *Anthography of the Eucalyptus*, an attempt has been made to present in popular form, facts and observations concerning many species of the genus. The facts have been gleaned from the published records of authorities who have studied our trees since white men first landed on the shores of Australia. The stimulus to their elucidation has been supplied by a personal curiosity to know something about the trees that present themselves to view on any part of this island continent. In the search for this "something," many odds and ends of interesting information have been accumulated, and, as it is felt that an increasing number of Australians wish to know the same things, the facts as thus collected are here presented.

The story of each tree begins with the recognition by some observant person of differences, in gross or in detail, that it presents in contrast with the trees that surround it. Naturally the identity of the person making the discovery and the time of the discovery begin the story. Therefore the namer of the species and the date of his observations are recorded.

On the entry of civilized white man on this tract of land that had been so long isolated from the rest of the world's land masses, it was immediately apparent that the trees differed from those of other lands, and when the first specimen was botanically examined, the genus

was found and named. Within a few years, the authority of the day had recognized six species patently different from each other. Information derived from further investigation enabled a botanist of high repute to assert that he could recognize twenty-four species of eucalyptus, and that he suspected the existence of even more than these. Years later an equally reputable botanist announced that the genus contained the incredible number of eighty odd species. To-day the highest authorities agree that over four hundred Eucalypts have attributes so essentially different that each is entitled to rank as a type. How far the number may be increased depends on the limit set to the business of straw-splitting. How soon it may be reduced from esoteric complexity to a comprehensive simplicity depends on the discovery of the factor that will lead to the arrangement of the species in the order of their evolution.

It seems strange that the constituent matter of the whole planet should have been resolved by chemists into ninety-two elemental substances of definite inter-relationship, whilst one isolated group of plants defies all attempts at satisfactory classification.

The four hundred odd species that are now named, and recognized as types, are the highest expression of the development of certain features that run through the whole genus. These types are not fixed by positive numerical assessment of any one feature or features. They are therefore not immutable, but have a range of character that changes imperceptibly in every feature from one type to another. The named species must be considered as acquaintances, whose features are known to us, in a crowd of strangers whom we hope to know, and to whom we can only be introduced by mutual friends.

It is impossible to forecast which feature will supply the key to the evolutionary order of the genus. It is probable that a full knowledge of all the facts will lead to the derivation from several features, of a factor that can be numerically valued, and will indicate the manner in which the genus has been evolved in the temporal process from the common ancestor.

If one single feature were to be explored for such possibility, general considerations indicate that the operculum might be fruitful in results. It is the lid of the flower which definitely distinguishes the genus from all other plants. It would be fair to assume that it serves some purpose helpful to the plant in its struggle for existence.

If it be an increasing purpose, the simple operculum would be precedent of the complex. If it be a diminishing purpose the order would be reversed. In either case the measure of its simplicity would be a record of progression or retrogression of the species.

An obviously simple operculum is that of *E. calophylla*, which is little more than a rudimentary membrane protecting the generative organs, whilst *E. Lehmanni* has a deep, thimble-like lid that can be instanced as a manifestation of complexity. Between these two limits, therefore, should the hypothesis be sound, lie all the various opercula.

To gain a measure of comparative simplicity (or complexity), the convexity of many opercula has been measured. Convexity has been assumed to be the ratio of the height to the base. Fresh or undistorted opercula have been collected from typical trees, and measured with callipers or travelling microscope. Although data comprehensive of the whole genus have not yet been collected, enough is available to show definitely interesting results. The range of complexity is approximately from 4: 1 to 1: 4; that is to say, the simplest operculum (*E. ficifolia*) is four times as broad as it is high, and the most complex (*E. cornuta*) is four times as high as it is broad. A close approximation to an average is maintained by one tree, and only a slightly less close approximation by trees of the same species.

An enormous amount of work is necessary to provide sufficient data by which to prove or disprove the theory, but from the preliminary figures available, hopeful results are to be expected. The subject is mentioned here in the hope that it may provide some inspiration for workers along fresh lines of investigation.

A proper understanding of the relationship of the species to one another within the genus, may be found by likening them to the phenomenon of sound. Sound is a sensation produced within us by air vibrations impinging on the organs of hearing. The musical sounds corresponding to the notes of a piano key-board, stand in harmonic relationship one to another, and for the sake of convenience they have been given specific names. That there is an imperceptible transition from one to another is demonstrated by a violin string being shortened while bowed, or by the rising note of a steam siren. To an untutored ear it is all just sound, even a noise. To an untrained eye our trees are just trees—even a gum-tree is just a gum-tree. The musically trained ear can detect the change from note to note, and even recognize a

single note and know its position on the key-board. It is the outstanding notes that have been named and are used in music. Between each pair are many slightly differing notes, whose occurrence can only be detected by the highly trained or gifted ear. The eucalyptus species correspond to the outstanding notes. The highly expert ear can detect differences that are hidden to the less expert, in the same manner as the trained eye discriminates between the trees. The physicist knows the musical sound by the length of the wave producing it, but the attribute of the gum-tree corresponding to the wave length of sound has yet to be revealed.

To the friends and enthusiasts who have helped in the collection of specimens for photography, most grateful thanks are tendered. Many species are still missing from this edition—including a few trees which are important and well distributed.

In the decade that has passed since the first edition, the author has made frequent calls on the knowledge and patience of Mr P. R. H. St John of the Botanic Gardens, Melbourne. The accuracy of his observation and the extent of his memory are as unfailing as his willingness to help, and the author now offers again his tribute of gratitude.

RUSSELL GRIMWADE.

Melbourne,
November, 1930.

AN ANTHOGRAPHY OF THE EUCALYPTS

I

On January 26 1777, H.M. Ships *Resolution* and *Discovery*, carrying Cook's third expedition into the Pacific Ocean, dropped anchor in Adventure Bay on the south coast of Tasmania, not many miles from where Hobart now stands. Among those on board were William Anderson, the naturalist, and David Nelson, his assistant. To these two men belongs the imperishable distinction of having introduced to the knowledge of the civilized world the first member of the wonderful genus now known as *Eucalyptus*.

William Anderson had accompanied Cook's second expedition (1772-75) in the capacity of surgeon; there can be little doubt that he then noted these trees as the dominant component of the vegetation, for he used the generic name *Aromadendron* to distinguish them. It was, however, from a specimen collected by David Nelson in 1777 that the genus was first botanically described; this was done in 1788 by L'Herétier, who gave it the name it will always carry. To the tree from which this particular specimen was taken L'Herétier gave the specific name of *obliqua*, in apt reference to the unbalanced growth of the leaf on either side of the midrib. This character was subsequently found in many species of the genus; but few have this "kink" more markedly or more constantly developed than *obliqua*, which is the famous "Messmate" or "Stringy-bark" of eastern Australia.

In 1814 the generic name *Eudesmia* was coined by Robert Brown, but priority demanded the retention of the established name.

The name *Eucalyptus* is admirable alike in euphony and conception. It has a noble sound, and by its derivation connotes a rare character possessed by few other trees. The actual bloom of the *Eucalyptus* is surmounted by a lid or "operculum," which seals the flower until

thrown off in the process of opening; the reproductive organs of the tree are then exposed for the process of fertilization. By this "lid" the essential organs are so well covered as to justify a generic name derived from the Greek εὖ "well," and καλυπτω "I cover." These opercula vary within the widest limits in respect of size, shape and character. But, whether in forest giant or stunted mallee, the operculum is ever present, and unmistakably distinguishes this genus of trees.

II

The natural distribution of the Eucalypts is practically confined to Australia; apart from those species to be found in the islands of the Austro-Malayan group the genus does not occur elsewhere, not even in New Zealand or in the islands of the Pacific. In Australia and Tasmania it probably forms three-quarters of the natural forest, and presents itself in forms as diverse as the climates it enjoys.

From tropic to sub-temperate zones, from sea-level to an altitude of 5000 feet, with ten inches or less to ten feet or more of annual rainfall, from clefts in rocky sandstone to luscious loam—everywhere, certain members of the genus persist.

Among them are some of the tallest trees in the world; but the forest giant of three hundred feet and more is full brother to desert dwarfs little higher than a man. Some yield timber of great beauty and usefulness, some are only fit for firewood; some yield honey, some oils possessing fragrance or medicinal value; some produce flowers unexcelled in form and colour. They are, indeed, a race of trees apart, and in their variety, utility and adaptability have no compeers on earth.

No other genus affords a tithe of the variety, interest and inspiration of the Eucalypts, of which at present over two hundred and fifty species are recognized and recorded with scientific accuracy. Only one other known genus—*Acacia*—numbers more species than *Eucalyptus*, and Acacias are of many nationalities.

III

The settlement of Australia in 1788 introduced botanists to a virgin

and uncharted continent of vegetation, and the student of to-day must admire the amount and accuracy of the work of the early botanists. Scientific observers were on the new field at once, collecting facts for classification; whilst specimens and seeds were distributed abroad with surprising celerity. The genus *Eucalyptus* was remarkably defined and easily recognized. Attention appears to have been concentrated since then on the subdivision of the genus into natural sections, so that orderly and precise arrangement might prevail. A hundred years ago or so this object probably seemed easier of attainment than it does to-day. The known facts, being fewer then, permitted simple subdivision; this was first attempted on the basis of one feature only—the operculum being selected as the distinguishing character—and later, the leaves and leaf-stalks. Subsequently Bentham founded an elaborate system on the morphology of the anthers. This was followed by von Mueller's classification of the barks, in which the genus was divided into six groups—smooth, box-like, wrinkled, stringy, iron-bark, and scaly. The deficiencies of this system were again made manifest as field-knowledge of the trees became extended, for it was found that trees, which by other standards of judgment are undoubtedly identical, developed dissimilar barks on different soils.

It has, therefore, come to be recognized as essential to the establishment of the identity of a species that all individual characters of the specimen should be judicially taken into account. The character of any single part—of the bark, for instance—may narrow the choice of species considerably; beyond that point discrimination cannot be made without reference to some other part—operculum, seed or seedling. Barks are important; but probably the ripened fruits are relied on more often than other characteristics to determine the species.

A more recent attempt at classification has been developed by Baker and Smith, who ingeniously employ the character of certain tree-products as a means of diagnosis. The leaves of all Eucalypts contain more or less essential oil, which is easily separated by steam distillation. The yield of oil, its composition and its physical constants, vary within limits sufficiently great to suggest a possible basis for the

discrimination of species. The authors of this system claim that these features are constant amongst trees of similar species, and produce much supporting evidence gleaned from a vast amount of patient analytical work. Such features as the tannin and kino—commonly called "Gum"—in the bark are also made use of, and support the theory. It is unfortunate that the innovation of supplanting botanical morphology by chemical analysis involves time and skill beyond the reach of all but a few. It is conceivable, however, that in the future the collaboration of botanist, chemist and physicist may be needed to determine with certainty the identity of a species. Some would include a geologist also. In despair one satirist has declared that classification can only be made alphabetically.

An easy road to the grouping of the Eucalypts has yet to be discovered. There is no infallible rule. The vast areas they occupy, and the difficulty of collecting specimens from trees that tower three hundred feet into space from rugged mountain sides, are only two of the many causes that delay the winning of a full knowledge of the genus. But every day bricks of facts are added to the structure; if the rate of building overtakes the progress of evolution, it will some day be complete. Then, and not till then, will the riddle of the Gums be answered.

IV

Any categorical arrangement of the species being thus inaccurate and misleading, the illustrations are presented in geographical order.

If one were to start a long journey in the north of Queensland, and travel round the coast in a southerly and then westerly direction, the Eucalypts would be encountered more or less in the sequence here maintained. But such a system can be applied in a general sense only, as, whilst some Gums have a restricted habitat, others extend for thousands of miles and enjoy the freedom of three or four States.* It is necessary to digress from Victoria to Tasmania, and return thence to South Australia.

This imaginary journey at once impresses on the mind the adapta-

* The true Red Gum (*E. rostrata*) occurs in every State except Tasmania.

bility of the genus in accommodating itself to such a range of climate and country. Moreover, it reserves to the last the wonderful varieties of Western Australia. In whatever sense the Gums be valued, whether for their utility or their horticultural value, those of Western Australia are in the front rank. Among them are the Jarrah, world-famous for its endurance; Rose of the West, a small thicket tree with silver-grey leaves and a large rose-coloured flower; and *E. ficifolia*, that gorgeous lawn tree so popular in the eastern States.

V

The natural proclivity of the Eucalypts to develop species very slightly different in character is reflected in the vernacular names by which they are known. It is easily understandable, when trees of various species are so similar, that they should share the same common name. "Box," "Stringybark," "Blue Gum" and "White Gum," for instance, mean very different trees in different places. "Red Gum" in the eastern States is *E. rostrata*, the noble smooth-barked tree that lines our water-courses and has deep red timber: "Red Gum" in Western Australia is *E. calophylla*, a rough-barked white-timbered tree that exudes a characteristic red gummy matter from the fissures of the bark. At least four States have a Blue Gum. In Tasmania it is *E. globulus*, in New South Wales *E. saligna*, in South Australia *E. cosmophylla*, and in Western Australia *E. megacarpa*. There is a similarity between these species as regards trunks and general appearance, but it disappears entirely when one compares their flowers and fruits. Some of the rarer species, known only to botanists, have no vernacular name at all.

The nomenclature of this book is based on the following principles:--

i. The names of all Victorian species have been given in accordance with the decisions of the Victorian Plant Names Committee, which has in recent years reviewed and condensed the rather chaotic list of names in common use.

ii. In the case of widely-distributed species, known by a host of names in a number of localities, an endeavour has been made

to select the name most appropriate to the character of the tree and least likely to confuse it with other species.

iii. Preference is given to native names over the hyphenated names which some writers favour.

The reader is advised to study and commit to memory also the botanical names; he will thus become accustomed to the idea that they are really distinct—and an appropriate vernacular name, emphasizing the distinction, may gradually be attached to each of them.

VI

The leaves of the Eucalypts are in themselves a subject of study. What may be termed a typical leaf is long and narrow, tapering to a fine point. Yet there are species which have broad oval leaves, while others have them as narrow as a blade of grass. The foliage of young trees and "sucker" shoots is, in the great majority of cases, entirely different from that of the mature trees. A complete metamorphosis often takes place in a season or two—generally within the first few years of growth, and generally from the top of the tree downwards. As this change takes place gradually, there is a stage when the tree presents both forms of foliage at the same time, and appears to be passing from adolescence to maturity.

Seedling leaves are lanceolate, oval or round, and generally set on branchlets opposite to one another, frequently without stalks. The mature leaves have decided stalks, and occur alternately on the branchlets. As if to maintain a reputation for "fixed irregularity" (or "irregular fixity") some few species undergo no change, but retain throughout life the stalkless leaves of youth. Some leaves are thin and flexible; others are leathery and rigid; some are equally coloured on both sides; others bright above and dull below. The veining of the leaves varies with the species, and the system appears to be connected with the character of the essential oil. Many leaves are set pendulously on the branches—which accounts for the fact, early noted, that Gum trees cast little shade compared with trees whose leaves are more or less horizontal. The variety of foliage is as great as the

variety of flowers or barks, and ranges from a leaf like that of a young cabbage to one two inches wide and two feet long—from dark shining green to glaucous silver grey—from opalescent blue to brilliant red. On very rare occasions do some trees show a variegated leaf.

As with the leaves, so with the flowers. The vast majority are white or cream, but there are blooms of all shades in reds and pinks, varying to green and yellow.

The colour of the bloom cannot be taken as fixed. A few coloured species show no evidence of change, and breed truly from the parent tree; others are quite uncertain, and even change the colour of the flower during their growth. Our acquaintance with the Eucalypts has not yet produced sufficient data to formulate the law governing this feature, or to ascertain whether climate, soil, environment, traumatism, heredity or hybridism causes seeds from a highly-coloured flower to produce sometimes trees bearing flowers of as high a colour, sometimes trees whose flowers are colourless. There must be some law correlating cause and effect, but so far the evidence is insufficient even to suggest a working hypothesis. Scores of observations record an acquisition of colour, and as many a loss of colour, in the succeeding generation. Many flowers are small and inconspicuously set; but degrees of prominence and abundance are met with that culminate in a wonderful blaze of inflorescence. In characteristic paradoxical fashion, the largest species have, as a rule, the smallest flowers. Also, the higher the leaf on the tree the smaller it is.

Certain it is that the largest trees have the tiniest seed.* The old aphorism that "Great oaks from little acorns grow" loses compass with the contrast that some Gums provide. Monarchs like *E. regnans*, that tower erect for over a hundred feet without a branch, that shake the earth when they fall and provide enough timber to build a house, are born of a seed little larger than a full-stop on this page.

VII

The economics of the Eucalypts, a field of study both important

* A pound in weight of *E. Macarthuri* seed was counted and found to contain over half a million potential trees.

and vast, cannot be dealt with in a book of this nature. For that reason reference to the tree-products of the different species has been usually omitted. It is fitting, however, to allude here to their variety, as another and a most important reason for soliciting the regard and respect of the people whose property they are. The greatest tree-product is timber, and in this the genus is unique. None of them yields what is technically known as "soft" wood; but for hard-woods or cabinet-makers' timbers no genus can compare with them. For every use of the art-craftsman, and for almost every structural and industrial purpose, there is a suitable timber yielded by one or other species of the genus. The furniture-maker has choice of woods pale or dark-coloured, straight-grained or highly-figured; the architect and engineer have timbers for use above and below ground, all of an inherent strength and quality that place them first in the lists of comparative tests. The applications of Eucalypt timbers are innumerable in every sphere of commercial activity, and are certain of great extension as experience gains for them the rational and scientific treatment they deserve.

Every species of the genus contains in its leaves more or less essential oil, the character of which is peculiar to the species, and gives it a commercial value for purposes ranging from medicine to the highest expression of the perfumer's art. Some of the barks yield fibres industrially applicable; some kinos, of more limited usefulness at present, but of such promise that they amply warrant extensive scientific research. Moreover, research into the rate of growth of various species (which involves the amount of cutting allowable) and into the special fitness of each for forest or plantation purposes is still needed. But all this necessitates a statesmanlike control of our timbered areas that in the past has been conspicuously absent.

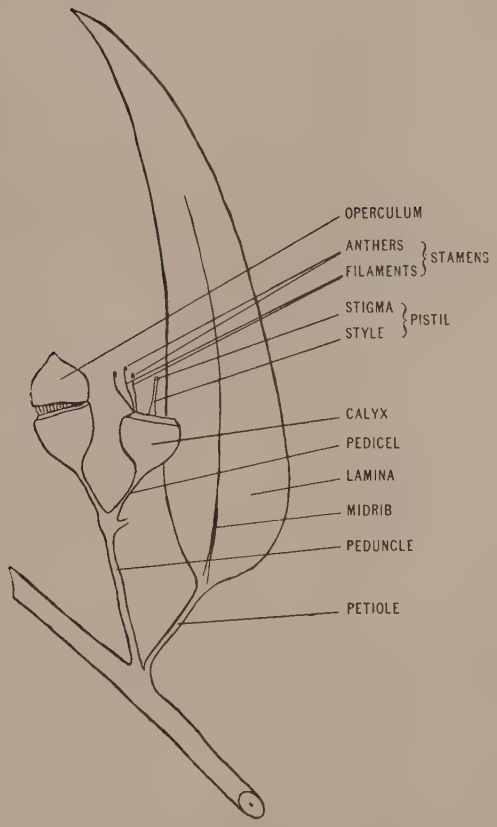
GLOSSARY

(Partly to be terse in description, partly to conform to botanical practice, certain technical terms have been used in the text instead of their more usual popular synonyms. A list of them, with their meanings, is appended.)

ACUMINATE	Pointed.
ACUTE	Tapering towards a point.
ALTERNATE	Occupying every second place.
AXILLARY	Occupying the angle between leaf and branch.
BRACT	An irregularly developed leaf at base of flower.
CALYX	Flower-cup.
CAMPANULATE	Bell-shaped.
CLAVATE	Club-headed.
CONNATE	Growing together at the base.
CORDATE	Heart-shaped.
CORIACEOUS	Leathery.
CORYMBOSE	With branchlets or flower-stalks arising from different points on one stalk to form a level head.
CRENATE	Notched.
DECORTICATING	Dropping off (of bark).
DECUSSATE	Arranged in pairs which successively cross each other.
EXSERTED	Standing out.
FALCATE	Scythe-shaped.
FISSILE	Easily split.
GLABROUS	Smooth, without hairs.
GLAUCOUS	Blue-green, or covered with a bloom of that colour.
INSERTED	Set inwards—opposite of "exserted."
JUVENILE	On seedlings or sucker-shoots (of leaves).
LANCEOLATE	Long, narrow and tapering like a spear head.
LATERAL	Growing from the side of the branchlet.

LENTICULAR	Shaped like a lense, bi-convex.
MATURE	On full-grown plants or trees (of leaves).
MUCRONATE	Sharply pointed.
OBCORDATE	Heart-shaped, with the apex at the stalk-end.
OBOVOID	Egg-shaped, with the broad part furthest from the stalk.
OBTUSE	Blunt or rounded at the extremity.
OCELLATE	Like an eye.
OPPOSITE	Growing in pairs.
OVATE	Almost oval, but broader towards the base.
OVOID	Egg-shaped.
PANICLE	Stalk divided into branchlets each bearing one or more flowers.
PEDICEL	Small stalk bearing single flower.
PEDUNCLE	Fruit- or flower-stalk.
PELTATE	Shield-shaped—applied to a leaf that has its stalk attached within the margin.
PETIOLE	Leaf-stalk.
PILULAR	Shaped like a pill, small and globular.
PYRIFORM	Pear-shaped.
ROSTRATE	Shaped like a bird's beak.
RUGOSE	Wrinkled.
SESSILE	Stalkless, attached directly to branch.
STELLATE	Radiating in the form of a star.
TERETE	Cylindrical.
TESSELATED	Chequered.
TRUNCATE	Lopped off.
TURBINATE	Shaped like a whipping-top.
UMBEL	A group of flowers radiating from a centre.
UMBONATE	With a boss like a shield.
UNCINATE	Hooked.
UNDULATE	Wavy.
URCEOLATE	Shaped like a pitcher.
VERRUCOSE	Warty.

These terms can be used in combination also. Thus "ovate-lanceolate" means "oval but tapering towards the ends;" "truncate-ovoid" means "like an egg with its top knocked off;" "lanceolate-acuminate" means "tapering to a very sharp point."



A TYPICAL EUCALYPTUS FLOWER

ANGOPHORA INTERMEDIA

Gum-Myrtle

The genus *Angophora* is exclusively Australian, occurring as five different species only in the three eastern states of the Commonwealth.

In all its forms the tree presents a general appearance closely resembling the eucalypts. In some cases the resemblance is so great as to need close examination of the flowers and buds or fruits before differentiation can be made.

The genus ranges from comparatively small shrubs to large forest trees, from rough and fibrous barks to smooth, clean boles that are quite indistinguishable from gum-trees.

Great interest lies in these trees, as it is clearly manifest that they are the immediate ancestors of the genus *Eucalyptus*, and that evolutionary influences have converted the sepals and petals of the angophoras into the opercula of the eucalyptus.

It is suggested by a comparative study of the oils and leaf venations of the two genera that the descent of the eucalypts was through the bloodwood group, and it is noteworthy that such eucalypts as *tetragona* and *tetradonta* have their stamens arranged in bundles which indicate an incomplete abandonment of the petal-growing influence.

The name *Angophora* is derived from two Greek words meaning vessel-bearing and has reference to the cup-shaped fruits of the trees.

E. CREBRA F.v.M.

Narrow-leaf Ironbark

Over the whole range of country from central New South Wales to northern and tropical Queensland this tree is so ubiquitously distributed that von Mueller, the author of the species, was prompted to coin its specific name from the Latin word meaning frequent. The first description was published in 1858.

It is a moderate-sized tree, and presents the appearance of a typical ironbark with its rough, furrowed and persistent dark bark. It has been observed that in the more tropical latitudes the furrows are shallower and the leaves thicker and more glaucous.

The typical leaf is linear-lanceolate, generally under six inches long and about a quarter-inch wide, thin in texture, of equal colour on both sides, and frequently falcate. The foliage is decidedly pendulous and the branchlets slender, so that the tree is frequently of "weeping" habit.

The umbels contain three to seven flowers on short pedicels on long, slender, terete peduncles, and frequently occur as a terminal panicle.

The fruit is quite small, semi-ovoid in shape, with a narrow, contracted rim and inserted valves.

The timber is of reddish colour, heavy, hard, and very durable.

E. CITRIODORA F.v.M.

Lemon-scented Gum

Synonyms: E.maculata var. citriodora
E.melissiodora

The habitat of this graceful tree is practically the whole of the tropical portion of eastern Queensland.

In general appearance and in morphological analysis it bears such resemblance to Spotted Gum (*E.maculata*) that it was long considered a variety of that species. The character of the oil distilled from its leaves is so entirely unlike that of the Spotted Gum that the lead of von Mueller has been supported by popular acceptance and nomenclature to such an extent that it may be regarded as a definite species.

Depending upon the state of growth and season at which they are distilled, the leaves yield from half to one per cent of oil, consisting almost wholly of citronellal, the characteristic constituent of the oil expressed from lemon peel. This feature of "lemon scenting" accounts for the specific name and yields a ready clue to the identity of the tree. Taken in conjunction with its smooth, grey or mottled bark it is conclusive.

The juvenile leaves are notably hairy and peltate. The adult leaves are glabrous, slender and lanceolate. The foliage of the mature tree is sparse and graceful.

In comparison with Spotted Gum the bark is usually bluer and less mottled.

The species is much favoured for plantation and ornamental purposes, and thrives over a considerable range of soil and climate. Fine cultivated specimens are to be seen as far south as Hobart.

Like its affinity, Spotted Gum, the real beauty of the tree lies in the slender trunk of delicate profile and silken texture.

E. MICROTHECA F.v.M.

Coolabah

Synonym: E. brachypoda

In the more arid inland areas of western New South Wales, Queensland, Central Australia, and the Northern Territory the Coolabah occurs—in some localities as a small gnarled tree, in others, especially in sites that are occasionally flooded, as a tree eighty feet high and taller than the surrounding vegetation. In tropical Western Australia the trunk and branches may appear as if whitewashed whereas on the black-soil plains of New South Wales it has a rough, scaly, and persistent bark with rather dense and drooping foliage. It is the principal tree whose roots are explored by the aborigines in search of water, and in the bark of a specimen on Cooper's Creek was cut the tragic message by which the Burke and Wills party learnt that they were hopelessly abandoned.

The leaves are up to nine inches long, falcate, and pale grey-green on both sides, with petioles up to one and a quarter inches long.

The flowers are usually terminal and arranged in umbels of three to eight.

The fruits are comparatively small (larger than *E. crebra*), hemispherical, three to five celled, on slender, terete peduncles with exserted valves.

The timber has a light grey sapwood and deep red heartwood which is very heavy and durable in underground use.

The species was first described in 1858 by von Mueller who coined the name from Greek words signifying small celled in allusion to the comparatively small size of the fruits.

E. MELANOPHLOIA F.v.M.

Silver-leaf Ironbark

A DEEPLY furrowed, black, persistent bark and glaucous, cordate leaves characterize this small tree. Specimens with alternate, stalked leaves have been recorded, but the normal leaf is opposite and sessile, and it is a feature of the species that the tree appears to reach maturity by flowering and seeding whilst the foliage retains the characters associated with adolescence in most eucalypts.

The tree is found in the drier parts of northern New South Wales and Queensland, and was first described by von Mueller in 1859. The specific name is made from two Greek words that mean black bark. In the Macquarie River district it is known by the aboriginal name of "Ginghi," which is recorded as "Ghinghit" in the Dubbo district.

The bark is sufficiently fissured and black in colour as to resemble that of many exotic pine species.

The leaves and buds are silver-grey and mealy.

The flowers are small, generally from three to six on a long, slender peduncle, forming a terminal panicle.

The fruits are hemispherical or globular on short pedicels. They have sharp and contracted rims and valves but very slightly exserted.

E. LEPTOPHLEBA F.v.M.

Yudhulwan

Although originally described by von Mueller in 1859, and named by him in allusion to the slender veins of the leaf, this tree is, even now, not very well known. In habitat it is restricted to northern Queensland, especially to the eastern shores of the Gulf of Carpentaria.

It is a tree attaining a height of sixty feet with a dark, rugged, and persistent bark which resembles that of *E. crebra*, but which is prone to break up into small squares in the manner of *E. tesselaris* so that the bark appears of box type.

The fruit is considerably larger than that of *E. crebra* and is elongated ovoid in shape with the valves exserted above the rim.

The opercula are long and acutely conical, which again differentiates it from *E. crebra*.

The flowers are prominent, and both terminally and axially set on the branchlets on both slender pedicels and peduncles.

E. TERETECORNIS var. INSULANA Bailey

The species *teretecornis* is notable for its variability, and many varieties of it have been put forward from time to time. The specimen here illustrated was taken from a tree cultivated in the Botanic Gardens, Melbourne, and now standing about twenty-five feet high. It was raised from seed from small trees only a few feet high found growing in elevated and exposed positions on Middle Percy Island, tropical Queensland.

It was first described by F. M. Bailey in 1906 under the provisional name *E. insulana*, but doubt was expressed by the author as to whether its acceptance as a species could be justified. Its status in the genus was defined by J. H. Maiden in 1917 in his *Critical Revision* wherein he expressed the opinion that it was an intermediary form between the type *teretecornis* and the variety *latifolia* which had its habitat in a neighbouring locality.

The case of this tree probably illustrates the changes due to soil and environmental conditions as it can scarcely be referred to the type although it is closer to that than association with the name *latifolia* would suggest.

E. MICROCORYS F.v.M.

Tallow-wood

This species grows to a very large and commercially important tree on the better soils of the coastal areas of northern New South Wales and southern Queensland. It is the tallest tree of the Northern Rivers district, where it is extensively milled, producing one of the finest hardwoods.

The wood has a peculiar greasy nature—hence the popular name—and great durability. It is of a pleasing yellowish-brown colour for flooring and great strength for constructional work such as bridge-building.

In 1860 von Mueller described and named the species, coining the name from the Greek words meaning, literally, small helmet, in reference to the comparatively minute size of the operculum covering the bud.

The bark of the tall symmetrical trunks is woolly and fibrous in texture. It is of rusty brown or yellowish colour, persists on the smallest branches and often becomes corrugated with age.

The leaves are petiolate and lanceolate, markedly thin and membranous with transverse venation. The underside of the leaves is pale and dull—a feature that is even more accentuated in the juvenile foliage. The leaves on bruising have a turpentine-like odour.

The buds are long and clavate in umbels of four to eight with small hemispherical opercula.

The fruits are elongated pear-shaped, on long, slender pedicels and peduncles, with flat tops and valves very slightly exserted.

E. GRANDIS Hill

Flooded Gum, Toolur

SYNONYM: E.SALIGNA VAR. PALLIDIVALVIS

THIS is a magnificent and useful tree whose claim to specific rank has suffered some reverse. First described by W. Hill, director of the Brisbane Botanic Gardens, in 1862, it was not formally recognized as distinct from *E. saligna* until Baker and Smith in 1902 described it under the title *E. saligna* var. *pallidivalvis*. In 1918 Maiden lifted it from its congeners under the fitting name quoted above.

The evolutionary changes that are operating on the whole genus present, in the era of to-day, no types more confused one with another, than *E. grandis, E. saligna,* and *E. botryoides*. Examples of each may be found so opposed in their obvious characteristics that any suggestion of kinship is unreasonable. On the other hand, the merging of one type to the other may be so gradual that two individuals contiguous in the scale may present no discoverable difference.

The distinction between *E. saligna* and *E. grandis* is subtle and morphologically ill defined. The oil of the former contains less eucalyptol than that of the latter, and the timber of *E. saligna* is darker in colour and denser than the timber of *E. grandis;* it is also less tough yet more durable. The young foliage and buds of *E. grandis* are less often glaucous than in its affinity, whilst its fruits are larger and generally coarser.

The habitat of the tree extends from about Goulburn, New South Wales, in the south to northern Queensland. Its greatest concentration is in the Northern Rivers district of New South Wales, where on the coastal belt and in the gullies of the foothills magnificent specimens stand straight and clean of limb in the glory of a clear blue-grey bark, towering above the surrounding trees and undergrowth.

The fruit is urceolate, either sessile or shortly pedicellate on an angled peduncle; glaucous, with the valves prominently exserted. The valves are whitish, from which feature the varietal name of the synonym was suggested.

E. PLANCHONIANA F.v.M.

Porcupine Stringybark

Needlebark

This tree has a limited distribution in southern Queensland and northern New South Wales.

It was described first by von Mueller in 1878, and by him was named in honour of Dr J. E. Planchon, Director of the Botanic Garden of Montpellier, France, who was responsible for the extensive planting in his country of Blue Gums and other species of eucalypts.

The tree is not well known outside its own district, but produces an excellent pale-coloured timber similar to that of *E. pilularis*. The bark of the tree is fibrous and stringy like that of Tallow-wood (*E. microcorys*) to which it bears considerable resemblance in general appearance. It differs greatly in botanical characters

The branchlets are angular, even winged, and the foliage of the tree particularly dense.

The young flower-buds are long and crowded in an umbel of three to seven, and as they develop the operculum becomes pointed and as long as the calyx-tube.

The fruit, set on a flattened peduncle, is conspicuously large, ovoid in shape, ribbed longitudinally, with the ovary deep set beneath a contracted rim.

E. MACULATA Hook.

Spotted Gum

ALTHOUGH the vernacular term, "spotted gum," may be applied loosely to several eucalypts occurring over the whole extent of Australia, there is none to which it applies more characteristically than to this famous and beautiful tree.

Forests of true spotted gum extend for miles on the South Coast districts of New South Wales and present a distinctive character and beauty that is most impressive. The especial beauty of this tree lies in the straight boles and trunks being mottled and patched in colours of grey, blue, and yellow by the shedding of the bark in small pieces. The trunk is perfectly clean and devoid of coarse outer bark, and is generally erect and symmetrical.

Apart from a small colony growing on a single mountain-side in Gippsland, Victoria, its range is restricted to the coastal areas of New South Wales and Queensland.

In general appearance the tree may bear close resemblance to *Angophora costata* (*lanceolata*), but a cursory examination of the fruit quickly dispels any doubt.

The juvenile leaves may be a foot long and three inches wide with the petiole entering above the base. The adult leaves are lanceolate, falcate, four to six inches long, almost equally green on both sides but very slightly duller below than above.

The fruit is characteristically urn-shaped with a thin rim and the valves well sunk.

The timber is reddish-yellow in colour and of a wavy grain. It is in great demand for the constructional purposes of carpentry and also serves well for the finer uses of joinery.

The species was first described in 1844 by J. D. Hooker, the botanist on the exploration ship *Erebus*, who subsequently succeeded his father in the directorship of Kew Gardens, London.

E. KIRTONI F.v.M.

Half-Mahogany

SYNONYMS: E.KIRTONIANA
E.PATENTINERVIS (R.T.B.)
E.RESINIFERA VAR. KIRTONIANA

THE confusion in the synonymy of this species arises from the fact that the earliest specimens were brought to the Melbourne Herbarium in 1879 by Kirton but lacked a proper botanical description. Mueller refers to this specimen in his *Eucalyptographia* under *E. resinifera*, but is cautious to remark that should further field and morphological knowledge elevate it to a species it might be named after its discoverer.

In 1899 R. T. Baker published a complete description of its botanical features and an analysis of its essential oil, claiming by priority of publication the name *E. patentinervis*. The accepted priority rule seems, however, to decide that it shall bear Kirton's name with the suffix "i" instead of "iana" as it was actually named by the discoverer and not vicariously in his honour.

The habitat of the tree is the northern littoral of New South Wales, where fine specimens up to 100 feet high of forest and timber value may be found.

In general appearance it lies midway between *E. resinifera* and *E. robusta*.

It is a particularly quick-growing species which feature together with its proclivity for a hot moist climate caused it to be cultivated in India. At Lucknow it is said to have grown to forty-five feet in ten years.

The leaves of the adult tree are lanceolate and falcate, up to twelve inches long, of equal colour on both sides (those of *E. robusta* are paler below), and set on a slender petiole. The veins are prominent.

The fruit is hemispherical to pyriform on a long pedicel—a distinct, wide rim with the valves prominently exserted.

The operculum is about as long as the calyx-tube, conical and sometimes tending to be rostrate.

E. PIPERITA Sm.

Sydney Peppermint

THE shores of Port Jackson being about the centre of the natural habitat of this tree, it was to be expected that it would be one of the first eucalypts described to botanists of the old world. Such is the case, for John White—surgeon-general to the Settlement—gives a drawing by Nodder and quotes a description in his diary published in 1790.

The description is made by J. E. Smith of the Linnean Society, London, from specimens of fruit and leaves collected and despatched by White, whose attention had evidently been drawn to the tree by the aroma of its leaves. He called it the Peppermint Tree because of the "very great resemblance between the essential oil drawn from its leaves and that obtained from the Peppermint (*Mentha piperita*) which grows in England." He found the oil efficacious in removing all "cholicky complaints."

To White is also the honour of initiating the Eucalyptus Oil industry for "a quart of the oil has been sent by him to Mr Wilson."*

Its kinship to the specimens of *E. obliqua* (miscalled *Metrosideros obliqua*) collected in Tasmania in 1777 was noted.

Since its first collection in the locality where Sydney now stands, it has been recorded as far north as southern Queensland and as far south as Gippsland, but it is essentially a tree of the New South Wales littoral, extending as far inland as the foothills of the Blue Mountains.

It is a tree growing to fine dimensions, clothed on the barrel with a fibrous bark, but smooth above and on the branches.

The leaves are five to six inches long, generally oblique, falcate, and accuminate.

The fruits range from urceolate to ovoid and spherical with a definite thin rim beyond which the valves do not protrude.

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* White (John), *Journal of a Voyage to New South Wales (1790)*, p 227.

E. PILULARIS Sm.

Blackbutt

Synonym: E.semicorticata F.v.M.

As this tree was abundant on the shores of Sydney Cove, where the first settlement of Australia took place, it naturally came under early observation. It has even been suggested by von Mueller that the illustration in John White's Journal (1790) of *E. piperita*, which is one of the earliest drawings of a eucalyptus species, shows fruits that are now recognized as typical of *E. pilularis*. Further, von Mueller points out that the fruit of *piperita* conforms more generally to the description pilular than does that of *pilularis*.

The species was named in allusion to the shape of the fruits and described in the *Transactions* of the Linnean Society in 1797 by Sir J. E. Smith. From the very earliest days it has had the vernacular name of Blackbutt by reason of the rough, stringy barked butt below the smooth and white branches. Before the word "Gum" was restricted to the smooth barked members of the genus it was known as Blackbutted Gum.

It is essentially a tree of the coastal belt of New South Wales, but it strays into eastern Victoria and southern Queensland. It grows to a great height with a gently tapering bole that is characteristic of the larger Eucalypts. It is recorded by J. H. Maiden that in eighteen months a tree at Gosford, New South Wales, attained a height of 25 feet and a circumference of 18 inches.

The timber is pale-coloured and fissile, and of considerable value for rough constructional purposes as well as for seasoning for joinery.

The leaves are lanceolate, falcate and occasionally hooked. They are shiny green when fresh and become of very pale colour on drying.

The buds have long, slender, angled peduncles, about eight forming an umbel.

The fruits are truncated globular with a definite rim and much inserted valves. They are noteworthy for considerable variation in size.

E. BOTRYOIDES Smith

Bangalay

Mahogany

SYNONYM: E. PLATYPODOS

THE type of this species came from the coastal belt of New South Wales close to the shores of Port Jackson, where the tree still prevails.

Its first description was made by J. E. Smith in 1797, in the *Transactions* of the Linnean Society, London, one page subsequent to the same author's description of *saligna*. This degree of priority of publication has been suggested by J. H. Maiden as sufficient grounds for making this species a variety of *E. saligna* as more than a century's field-observation and study of the two trees has failed to relegate satisfactorily many specimens to either type.

What is now known as *botryoides* has an extended range over the coastal belt from the Queensland border to southern Victoria. In the latter localities it is a large, umbrageous, handsome tree, clothed on the trunk and on the larger branches with a coarse, scaly bark heavily furrowed at the base.

The author of the species evidently saw in the arrangement of the fruits some resemblance to the clustering of grapes, and coined the specific name in allusion to this feature.

In 1796 the Spanish botanist, Abbé Cavanilles, created the name *platypodos* with allusion to the "flat-footed" flower-stalk which is a conspicuous feature. Etiquette demands that the earlier name must stand and the later one can only be recorded as a synonym.

The habitat of this tree, embracing the sandy coastal parts of Gippsland, Victoria, suggested its value as a plantation species in poor localities, and many trials over many years have proved its worth. It is a reliable and safe tree to cultivate and makes rapid and certain growth.

The mature leaves are broadly lanceolate and acuminate—often undulate—dark shiny green above and pale below. The leaves greatly resemble those of *E. robusta*.

The flowers are both lateral and axillary, and are arranged sessile, from four to ten in an umbel, on a flattened peduncle. The opercula are obtusely conical and less pointed and shorter than those of *saligna*.

The fruits are sessile and truncated or semi-ovoid, with a countersunk rim, and the valves frequently forming a Maltese-cross pattern when viewed from above.

E. ROBUSTA Sm.

Swamp Mahogany

"The size and strength of the tree, like that of the European *Quercus Robur*, seem peculiarly to justify the name *robusta*." Thus wrote Sir J. E. Smith in his *Specimen of the Botany of New Holland*, published in London in 1793. The quotation concludes an ample description of the tree, and, if not the most fitting species to bear this fine title, it must be remembered that it was applied when only half-a-dozen species of the whole genus had been encountered.

Its habitat being the coastal areas from southern New South Wales to southern Queensland, it came early under the observation of the first white settlers. As it occurs mostly on river-beds and in swampy localities it is commonly known as Swamp Mahogany—the hard, red, open-grained timber bearing some resemblance to the host of exotic timbers bearing that name.

It grows to a fairly large tree, clad with a reddish, soft, brittle bark.

The foliage is coarse, the individual leaves being broadly lanceolate and firm, with many lateral veins. Von Mueller states that they are "lighter colour above and more shining beneath," but this is clearly an error, the reverse being the fact.

The buds have distinct rostrate opercula, and seven are frequently arranged in stellate manner on a long, flattened peduncle.

The fruits are elongate-ovoid, truncated, and when viewed from above show a Maltese-cross design that is a helpful first guide to the identity of the species.

E. SALIGNA Smith

Sydney Blue Gum

In the study of the characteristics of this species its very close affinity to *E. botryoides* must be borne in mind. Whilst the two types appear to be entirely different they can and do merge into one another so closely that they are to all tests and scrutiny the same tree.

As the type of *saligna* has the approximate centre of its natural distribution about the shores of Port Jackson, where settlement first occurred, it was one of the earliest recorded species, being described in 1797 by J. E. Smith and named by him *saligna* because of some real or imaginary likeness of its foliage to that of the willows.

The tree occurs in the coastal belt and gullies of the tablelands from southern New South Wales to southern Queensland. In shelter and good soil conditions it attains considerable size, and produces an excellent straight-grained, red-coloured timber. The habit of robust trees is a long, clean bole of smooth bark with a very slight canopy of leaves. Under poorer conditions it does not reach great height, and the trunk is clothed at the base with a coarse, scaly bark.

The leaves are narrow lanceolate, shiny above and dull below, with fine, transverse veins.

The buds have short, pointed, or even rostrate opercula, which is a point of distinction from *botryoides*, which are shorter, more obtuse, and less pointed. The flowers are almost sessile, in umbels of four to eight, on stout terete peduncles.

The fruits are turbinate with a well-defined rim. The exserted valves are more characteristic of *saligna* than *botryoides*.

An illustration of the confluence of the two species were two trees that grew in the Bulli Pass a few miles south of Sydney. They were trees of about eighteen inches diameter at the butt, and arose from the undergrowth in two parallel trunks side by side. One was smooth-barked and blue-coloured, and appeared a typical *saligna*, the other was clothed over its entire length with the scaly, rough bark characteristic of *botryoides*. On penetrating the undergrowth they were both found to rise from the same root.

E. PUNCTATA D.C.

Grey Gum

Leather Jacket

This tree was first described by De Candolle, the Swiss botanist, in 1827 and owes its specific name to invariable presence on the underside of the leaves of small black dots. It has been found subsequently that the same feature is often present, but to a less degree, in *E. resinifera.*

The first guide to the identity of the tree is the bark which, whilst smooth enough to satisfy the vernacular name of gum, is roughish in appearance and of a peculiar leaden effect that when once noted is found to be quite characteristic.

The vernacular name Leather Jacket seems appropriate and distinctive, but is in much more restricted use than that of Grey Gum.

The tree is distributed on the coastal belt of northern New South Wales and southern Queensland, and specimens grow to moderate size with a trunk diameter up to three feet.

The leaves are lanceolate, falcate and palpably thin—with spreading veins—paler in colour and duller below than above. It has been noted that its leaves are a food preferred by koalas.

The buds have conical and pointed opercula. About seven flowers form an umbel.

The fruits are hemispherical, shortly pedicellate on long angular peduncles. The domed fruit are a point of distinction with the flattened fruit of *resinifera.*

E. SQUAMOSA Deane and Maiden

Ironwood

For many years this tree was thought to be a variety of the forest Red Gum (*E. teretecornis*) and was allotted the varietal names of *squamosa*, *sphœrocalyx* and *amblocorys*. In 1897, however, the authors claimed specific rank for it, and it has since been accepted as a distinct tree.

Its chief distinguishing feature is the peculiar scaly character of its bark, of which cognisance is taken in its name. Another peculiarity is the frequent curving of the operculum which it shares in some measure with the Red Ironbark (*E. macrorrhyncha*).

Its habitat is restricted to that part of New South Wales bounded on the north by the Hawkesbury River and on the south by the National Park.

A typical tree about thirty feet high bears resemblance to the Grey Gum (*E. punctata*) with the leaden colour of its bark on the upper branches, but may be distinguished by the countersunk rim to the fruit (as opposed to domed on Grey Gum) and by the anthers.

The leaves do not exceed six inches, and are pale green and glaucous in colour.

The flowers are generally eight to twelve in the umbel on round peduncles which frequently arise in pairs from the axil.

The fruit is nearly hemispherical, with a faintly contracted rim and three or four valves slightly exserted.

The wood is of a deep red colour.

E. EXIMIA Sch.

Yellow Bloodwood

Mountain Bloodwood

This is a large forest tree whose habitat is centred about the eastern slopes of the Blue Mountains, New South Wales, from the Shoalhaven River in the south to the Hawkesbury River in the north.

It is known as a Bloodwood on account of the kino or blood-red gum that occurs between the concentric layers of the wood, and is distinguished as yellow by that colour prevailing in the outer flaky bark. It is also known as Mountain Bloodwood by its tendency to occur on the precipitous cliffs of the higher altitudes in distinction to other bloodwoods which favour the lower levels between the foothills and the coast.

It was first described in 1843 by Schauer, the Viennese botanist, from specimens collected by Bauer the artist, who accompanied Robert Brown on his collecting explorations.

The flowers are usually in terminal panicles and prominent above the foliage, so that the tree is conspicuous in full bloom. This feature appears to have guided the author to the specific name, which is taken from the English adjective eximious, in the sense that the tree in flower is distinguished or extraordinary.

The leaves are long, lanceolate and falcate, of thick texture and nearly equal colour on both sides.

The fruit is urn-shaped or truncated ovoid, with a contracted rim and sunk valves. They are sessile on a long, flattened peduncle.

Particular interest attaches to the operculum of this species. It is short, round and pointed or rostrate. Dissection of the unopened bud reveals the inner centre of the operculum extending downwards so as to be almost connate with the pistil. The line of fission of the operculum in the opening flower is irregular and ill defined, and the operculum frequently remains hinged to one side of the calyx during the whole of the flowering period.

E. SIDEROPHLOIA Benth.

Broad-leaf Ironbark

THIS is a definite Ironbark with a black, hard, and furrowed bark like other species of the same cortical group. It may be distinguished from *E. paniculata* by young trees having the bark not typically "ironbark," but laminated and scaly or even ribbony.

The species was first segregated by Bentham in his *Flora Australiensis* 1866, and the name made from Greek words signifying Ironbark.

The habitat is from the environment of Port Jackson, New South Wales, to southern Queensland, where the appropriate name Ironbark is used, generally qualified by "broad-leaf" and occasionally by "red" in allusion to the dark red colour of its timber. The wood has a great reputation for durability in constructional uses in common with that of the other Ironbarks.

The juvenile leaves are particularly large and broad. The mature leaves are either lanceolate or broadly lanceolate, slightly darker and more shiny above than below and only faintly falcate and oblique.

The buds number up to twelve in an umbel. They have long, definitely rostrate opercula (occasionally "egg-in-cup"), decided pedicels, and a long, terete peduncle.

The fruits are semi-ovoid with a narrow rim and four or five cells. The much exserted valves are a feature of ready distinction from most other Ironbarks.

A tree cultivated in Melbourne, and now twenty years old, has flowered profusely on many occasions, yet the bark, even at the base, is in no sense of Ironbark character, being still laminated and ribbony.

E. STRICTA Sieber

Mountain Mallee

SYNONYM: E.VIRGATA VAR. STRICTA

THE main habitat of this tree is the hilly districts between Braidwood and the Blue Mountains, New South Wales. It has also been found at Mount Wellington, Victoria. The specimen illustrated was collected on the golf-links at Leura. It grows in soils of poorer quality and may flower when only a few feet high, whilst in particularly favourable conditions it may attain a height of thirty feet.

Considerable confusion has surrounded the nomenclature of this tree since it was first described by Sieber in 1827, as it has since been redescribed by several botanists under such names as *E. microphylla*, *E. virgata*, and *E. rigida*. It is now, however, stabilized by general agreement to the name that the author coined for it with evident reference to the rigid and inflexible character of the foliage.

The tree has not been found at sea-level and plainly prefers high altitudes up to 2000 feet.

It has distinct affinity to *E. apiculata* and *E. obtusiflora*.

It has distinct Mallee habit, several stems arising from one root in characteristic fashion. It differs from the true Mallees in its low content of oil (.5 per cent).

The leaves are linear-lanceolate, shiny, and coriaceous.

The fruit is truncated globular and shiny, with a depressed capsule and usually with valves well sunk below the rim.

E. APICULATA R.T.B. and H.G.S.

Synonyms: E. microphylla
E. Cunninghamii
E. stricta var. rigida

A small shrub to be found in the undergrowth of the Blue Mountains, N.S.W. There appears to be no vernacular name current for this diminutive member of the family. As the shrub never exceeds eight feet in height, and is generally less, Dwarf Gum would be appropriate. The specific name has reference to the pointed character of the foliage. The earlier investigators considered this species to be identical with *E. stricta* despite its smaller habit, smaller features and much bluer foliage.

It has undoubted affinity to *E. stricta*, but the researches of Baker and Smith published in 1902 disclose differences that they claim constitute a species and these claims have since been accepted. The main claim is based on the disparity in the composition of the oil distilled from each tree and supported by a corresponding disparity in leaf venation.

The leaves are coriaceous and linear-lanceolate with a pronounced point. Six or seven flowers form an umbel.

The fruits are hemispherical or pilular, with a countersunk rim and inserted valves.

E. HAEMASTOMA Sm.

Scribbly Gum

SYNONYMS: E.HÆMASTOMA VAR. MICRANTHA
E.MICRANTHA
E.SIGNATA

THIS most attractive tree is a feature of the landscape in all the coastal areas about Sydney, and occurs in less concentration over the whole littoral from Victoria to Queensland.

In nearly all seasons its smooth and mottled bark displays prominently the "scribbly" zigzag markings of insect workings and thereby provides an unusual biological confirmation of the botanists' morphology on which the species was defined.

A considerable variation in the size of the flowers and fruits of this tree caused some authorities to define two species—the type (large-fruited) and a small-fruited one, but it is probable that conditions of soil and climate are the cause of such variation, and there is hardly need to perpetuate the distinction.

The first description was made in 1797 by J. E. Smith, who coined the specific name in allusion to the red rim of the fruit—a common but not distinctive feature of this species.

The normal leaves are lanceolate, falcate, and acuminate, variable in size, shiny, and coriaceous with prominent oblique veins.

The fruits are generally pear-shaped, with a rim more or less domed, of a brown or red colour. They are definitely pedicellate and six or more form an umbel on a long, flattened peduncle.

The tree has a host of vernacular names, being known in different localities as White Gum, Spotted Gum, Blue Gum, Cabbage Gum, Snappy Gum, Brittle Gum, and Brittle Jack (in allusion to its very brittle timber), but the name Scribbly Gum seems worthy of promulgation, as it is patently characteristic and not applicable to other species.

In general appearance the tree has likeness to *E. coriacea*, but may be distinguished by the "scribbles," the fruit, and the more oblique venation of the leaves.

E. PULVERULENTA Sims

Heart-leaved Eucalyptus

SYNONYM: E. PULVIGERA

THIS quaint member of the genus has so far been recorded only from three restricted localities in New South Wales. Two are on the westward foothills of the Blue Mountains, about 20 miles apart, and the third near Cooma in southern New South Wales. It is a shrub of straggling habit, rarely exceeding twelve feet high, and remarkably conspicuous by the heavy bloom that covers its entire foliage.

The leaves never become petiolate but remain in the sessile, opposite state that is generally characteristic of immaturity in the genus. In several species the usual metamorphosis of juvenile to adult foliage seems not to be reached, and in this species the phenomenon is more pronounced than in any other. *E. cinerea* and *E. cordata* have the same peculiarity but not so consistently nor markedly, and each can be easily separated from *pulverulenta* by the character of fruits and leaves.

E. pulverulenta was described and figured by Sims in the *Botanical Magazine*, London, in 1819 from a specimen cultivated in the Northampton Nursery from seed obtained from "New Holland," the name being suggested by the conspicuously pulverulent character of the tree. This is one of the many instances of the rapidity with which botanical specimens from the new land of the South found their way into cultivation in the old world. The passage of the Blue Mountains, which led to the habitat of this species, was not forced until 1813 and the road opened in 1815, yet a book published in London in 1819 contains an illustration in colour of specimens grown in England from seeds collected in Australia.

In 1825 Allan Cunningham published in Field's *Geographical Memoirs of New South Wales* a description of a tree of similar character. He used the name *pulvigera* and gave the locality as near Cox's River which he traversed on a journey from Sydney to Bathurst. There is little doubt that it was a rediscovery of the former species. The species is rare and considered by J. H. Maiden to be disappearing.

The specimen illustrated was taken from a tree cultivated near Melbourne. It is now about four years old and is only five feet high, of straggly, spreading habit. The bark on the stem and branches is thin and glaucous. On the butt it desquamates in thin flakes leaving a smooth, reddish surface. The whole shrub is white with glaucous bloom, and the leaves rigid, sessile and strictly decussate.

E. SIDEROXYLON A. Cunn.

Red Ironbark

Mugga

The passage of the Blue Mountains having been an insuperable barrier to westward exploration for over a quarter of a century to the settlement at Port Jackson, the first crossing in 1813 was followed in 1817 by Oxley's expedition to the western tablelands. Allan Cunningham accompanied the party in the capacity of botanist, and is the first to record this tree as growing in the Condobolin district.

He coined the specific name in reference to the steel-like hardness of its dark red timber.

It is now known to prevail in all parts of Victoria, save the south-western plains, and over the whole inland portions of New South Wales to southern Queensland.

Its most prominent feature is a dark, almost black, deeply furrowed bark, so rugged and rough as to closely resemble the bark of many exotic pines. Interspersed with the bark are kino grains giving it a short, friable nature and the general appearance of a burnt, greasy cake so that in many districts it is known as Fat-cake Ironbark.

The leaves are distinctly narrow, both in normal and abnormal growth, of equal colour on both sides with indistinct veins.

The flowers occur in umbels of three to six with filaments varying in colour from cream to red.

The fruit is turbinate or truncated ovoid, with a decided rim which frequently becomes detached at an early stage of ripening. The pedicels are long and slender, gradually expanding into the calyx, similar to *E. leucoxylon* although not so consistently.

E. SIDEROXYLON var. PALLENS A. Cunn.

Grey Leaf Ironbark

Any description of Red Ironbark, *E. sideroxylon*, applies equally well to the variety *pallens*, the two trees being alike in every respect save the colour of the leaves. In the variety here illustrated leaves of silver-grey are a constant character. In the species type the colour of the flowers is usually white and only occasionally pink. In the variety it is constantly pink.

From the popular standpoint the colour of the flower is perhaps all important, whereas from the scientific botanical aspect it is secondary to morphology and other factors. This is particularly true in relation to the eucalypts.

In some species the colour of filaments seems an inherent and fundamental quality, in others a transient, superficial property variable by accident, soil condition, or environment.

Instances to support these statements can be quoted. Crimson-flowered *ficifolia* from the Western Australian habitat breeds true to parental colour. Seeds from several generations of trees cultivated in the eastern states may breed truly, but may equally breed to any shade of red. Seeds from isolated trees of *leucoxylon rosea* give rise to both pink- and white-flowered trees. The same is true of *calophylla rosea*.

Until lengthy experiments give sufficient data for the elucidation of some determining factor no law can be postulated. Meanwhile much disappointment results to horticulturalists.

Macrocarpa and *erythronema* are usually bright red in colour. Occasionally they have yellow flowers and still more occasionally both colours on the same tree at the same time. White and dark red flowers have been seen on the same branch of *viminalis*, but in this case there was evidence of parasitic influences.

Despite these uncertainties the pink-flowered ironbark is a gorgeously ornamental tree adorning any garden in which it may be set.

E. VIRGATA Sieb.

Bulli White Gum

Synonym: E.Leuhmanniana F.v.M.

By the accident of appearing in an earlier paragraph on the same page of the same publication in 1827 the name *virgata* takes precedence, by formal resolution, over the name *stricta* for the small shrubby eucalypt that is found only in the National Park and Bulli Mountains near Sydney, New South Wales.

The species is economically unimportant, but is botanically interesting and a very beautiful and decorative addition to shrubbery plantation. It rarely exceeds fifteen feet in height, and has a slender stem clad with a smooth, white bark slightly flaky at the butt. It appears to be the rod-like character of the stem that gave rise to the specific name.

The leaves are long and equally green and shiny on both sides, very coriaceous and thick in texture.

The young pointed buds and angular branchlets covered with a heavy bloom are very beautiful and a useful characteristic in the identity of the species.

The flowers are large and prominent on thick, flattened and angular peduncles.

The fruits are semi-ovoid, with the top either flat or sunk, in which occur four or five cells.

E. MACARTHURI H.D. & J.H.M.

Camden Woollybutt

About the middle of last century this interesting tree attracted the attention of Sir William Macarthur by reason of its picturesque growth and limited distribution to a tract of country in the counties of Argyle and Camden in New South Wales. It was known then that its timber was of little value and durability in comparison with that of other species that accompanied it in natural distribution.

The species since then has been successfully cultivated in many parts, and in New Zealand in particular the timber has won some esteem for lasting properties.

The species was formally announced by Deane and Maiden in 1899 and given a name in honour of the prominent citizen who first drew attention to it.

In 1900 Baker and Smith announced the discovery that its essential oil contained roughly 60 per cent of free and combined geraniol, which is the characteristic and valued constituent of the oils obtained from geraniums and roses. Since that time the species has been cultivated on an extensive commercial scale in Victoria, but its low oil content (about .25 per cent) makes it impossible to economically compete with cheaper and more rapidly growing sources of similar essential oils.

The character of the oil makes a ready guide to the identity of the tree as the bruised leaves emit a dominant eucalyptus smell under which the sweet odour of a red rose may be detected.

The tree attains a height of eighty feet, and is clad with a box bark, but of rough and decidedly woolly type.

The young leaves are strictly sessile and opposite, cordate or ovate-acuminate in shape. The mature leaves are alternately set on the stalk, narrow acuminate in shape and equally dark green in colour on both sides.

The fruit is small, hemispherical or faintly conical in shape, with a decided rim and usually three or rarely four valves scarcely exserted.

E. MELLIODORA Cunn.

Yellow Box

This important species ranges in scattered distribution all over the three eastern states and nowhere occurs in forest growth. In open country it forms fine spreading specimens that preserve a constancy of habit and morphology.

The vernacular name of Yellow Box is applied throughout its whole range by reason of the definite yellow colour of the inner layers of the bark. The timber is also of yellowish tinge, but the colour revealed by incising the bark gives rise to the name. The tree is often of pendulous and umbrageous habit.

It was described by Schauer in 1843 from field discriminations made by Allan Cunningham who coined the specific name in apt allusion to the pronounced honey smell of the flowers. The tree is a favourite with bee-keepers, who aver that a good specimen can yield a hundredweight of nectar in a single season.

The bark is of sub-fibrous or box type, but varies to quite a rugged and heavy scaly character at the butt and to its extent on the trunk and branches.

The leaves are small, narrow and lanceolate, of equal colour on both sides and frequently glaucous.

The fruit is small and globular, or slightly pyriform, generally in clusters of four to seven with inserted valves below a definite rim.

The timber is not fissile, being of hard, interlocking grain that gives it great durability underground and in heavy constructional work like bridge-building. It is a valuable fuel.

E. POLYANTHEMOS Schauer

Red Box

This beautiful and distinctive tree was first described by Schauer in 1843 from material collected near Bathurst, New South Wales. It has since been recorded over a large range of country in Victoria and New South Wales, and forms a prominent feature of the flora in parts of the Yarra valley near Melbourne, in the north-east of Victoria, Riverina, and the Bathurst plains.

It is a true box with lizard-skin bark extending to the ends of the branches. It has grey-green leaves, set on long petioles that in the majority of trees are nearly round in shape, distinctly akin in outline to poplar leaves, whereby the tree shows some likeness to Bimble Box (*E. populifolia*), but from which it can easily be distinguished by the shiny dark green leaves of the latter. Moreover, the respective habitats are miles apart—Bimble Box being restricted to northern New South Wales and Queensland.

The author's name denotes the profusion in which this tree usually flowers, and the vernacular name alludes to the pale red colour of its wood. The tree is a favourite with bee-keepers, the flowers carrying much nectar.

Whilst the poplar-like glaucous leaf is a leading character of the type of Red Box, the tree occasionally bears lanceolate leaves, especially on its upper foliage.

Slaty Gum (*E. Dawsoni*), a species claimed by R. T. Baker in 1899, bears affinity to Red Box. It differs in having a smooth bark. The specific variation is based, however, on the oil-content and composition. Red Box yields 0.83 per cent of oil containing 53 per cent of eucalyptol as opposed to Slaty Gum yielding 0.18 per cent of oil containing only 5 per cent of eucalyptol.

The fruit of the Red Box is small, hemispherical, or pyriform with long peduncles. The rim of the fruit is thin and contracted.

The timber is hard and durable of interlocked grain. It enjoys with other boxes a high reputation as firewood.

E. HEMIPHLOIA F.v.M.

Grey Box

Forest Box

In 1859 von Mueller made a group of the genus *Eucalyptus* under the title *Hemiphloia* or "half-barks" by reason of the fact that the members of the group were prone to display a scaly or tesselated bark on the trunks only—the branches being smooth and devoid of such feature. In 1866 Bentham bestowed the name to specimens collected near Parramatta, N.S.W. and Moreton Bay, Queensland.

It is a perfectly well-defined species forming the forests of the plains of Victoria and the tablelands of N.S.W.—hence sometimes called Forest Box. It has a wide distribution on the whole coastal areas from South Australia to Queensland, being known in many localities as Grey Box from the colour of its "lizard skin" bark.

The timber is yellowish in colour, very hard and dense, and of good durability in heavy constructional work.

The tree may be confused with Scented Box (*E. odorata*), but the paler bark, larger and coarser foliage of a duller green of Grey Box usually serve to distinguish it.

The leaves are broadly lanceolate, five or six inches in length and of equal greyish colour on both sides.

The flowers range from four to ten in the umbel which is set on an angled peduncle.

The fruit is long compared to its diameter—almost cylindrical or urceolate and often slightly angled. The rim is thin and the capsule depressed.

E. BAUERIANA Schauer

Fuzzy Box

SYNONYMS: E.SUBROTUNDA R. BROWN
E.FLETCHERI R. T. BAKER

THE first specimens of this tree were collected early in the nineteenth century by Robert Brown, the botanist of the Flinders expedition, who gave the name *subrotunda* to the tree but failed to describe it. It was formally described by Schauer in 1843 from specimens sent to the Vienna Herbarium by Ferdinand Bauer and named by the author in honour of the collector.

The natural range of the tree is Gippsland, Victoria, through the coastal areas of New South Wales to southern Queensland.

The tree has great affinity to Red Box, *E. polyanthemos*, and has been classed as such by several authorities—notably Bentham and von Mueller. Differences in foliage, timber and oil, however, demark it as a distinct species, and it is now so regarded.

It is a moderate-sized tree, only occasionally reaching a size attractive to saw-millers. The timber is hard, of interlocking grain, and much paler in colour than Red Box.

The bark of the tree is persistent, grey and furrowed, of box type and such general appearance as to suggest the popular name of Fuzzy Box. In other localities such names as Bastard Box, Poplar-leaf Box, Brown Box, and Black Box are applied.

The leaves are very similar to Red Box in shape—perhaps darker in colour.

The flowers are terminal, from three to six in the umbel.

The fruits are small and conical with thin rims and inserted valves.

E. CORYMBOSA Smith

Bloodwood

This is the most important tree of the Bloodwood group, and as it was abundant on the shores of Port Jackson it was one of the first species of the genus to attract attention. In 1793 a short description of its character was published by J. E. Smith under a specific name that remarks the grouping of the flowers in a head or corymb. The tree flowers profusely, and at the height of its inflorescence is a conspicuous object among the surrounding trees.

The term Bloodwood was applied by the first settlers in reference to the exudation of a blood-like gum or kino that freely occurs from the bark of this tree, and although originally applied to this species alone, has since been usefully enlarged to embrace those eucalypts that display similar cortical appearance. The characteristic bark of all the Bloodwoods is dark-red coloured, rugose and persistent.

Since the first record of its occurrence about Port Jackson, the natural distribution has been found to cover the littoral belt from north-eastern Victoria to tropical Queensland. In places the species extends to the mountains, but seems to be limited to an altitude of about 3000 feet.

The prominent panicles of flowers and the "bloodwood" bark are the easy guides to the first recognition of the tree. It is confirmed by thick leaves that are pale on the underside and have numerous lateral veins that are almost transverse.

The Bloodwoods are conspicuously poor in oil-content, as is indicated by the comparative absence of oil-dots and the smell of the bruised leaf.

The prominent flower-buds have small hemispherical and umbonated opercula, and the flowers give place to definitely urn-shaped fruits on long pedicels and peduncles. A leading character of the fruits is the scaly appearance they present as they become older and as they may be found under the tree.

The timber is hard and dark-red coloured. It is permeated with gum-veins and enjoys a reputation for underground durability.

E. LONGIFOLIA Link

Woollybutt

Synonym: E.Woollsi F.v.M.

This tree occurs freely distributed in the forests that prevail from eastern Victoria to southern New South Wales. The type came from close to Port Jackson, and was first described by Link in 1822 from material in the herbarium of the Berlin botanical gardens.

The specific name is appropriate to the extent that whilst the leaves are longer than those of many species they are not the longest. The vernacular name Woollybutt describes the general appearance of the dark, persistent, and wrinkled bark that clothes the trunk and extends well on to the branches.

The leaves range about twelve inches long, and are dull of surface and the same shade of green on both sides.

The flowers are large and with their pointed opercula are reminiscent of *E. leucoxylon.* Usually three occur on long pedicels on long peduncles, which are either axillary or lateral and recurved in a manner that is a feature of the species.

The fruits are large and hemispherical or pyriform. They are frequently angled with two or four longitudinal ribs. The rim is prominently broad and may be flat, but is generally sloping outwards (like *E. leucoxylon*) with the three to five valves protruding slightly above it.

The timber is dark red in colour, and hard and dense. It is very durable in constructional work and resistent to insect attack.

E. PANICULATA Sm.

Grey Ironbark

The habitat of this tree being centred about Port Jackson, it early attracted the attentions of the first settlers, and was originally described in 1797 by Sir J. E. Smith from specimens collected for Sir Joseph Banks's herbarium. Since those days its natural range has been found to extend in the coastal zone over the Victorian border in the south and into Queensland in the north. The specific name alludes to the terminal and panicular arrangement of the flowers.

From the first days of settlement it was prized as a strong and durable timber for constructional purposes such as bridge- and house-building, and posts and piles. The timber is notably pale-coloured for an ironbark, and ranges from very pale to grey or chocolate. It changes colour somewhat on drying, but never assumes the reddish colour associated with ironbark woods. On account of its comparatively colour-free wood it is commonly known as White or Grey Ironbark, but the latter title has been adopted by the Plant Names Committee of Victoria.

The bark is rough, hard, furrowed, and persistent.

The normal leaves are lanceolate or narrow lanceolate, falcate, dull of surface, and paler below than above.

Three to eight pedicellate flowers form an umbel on a slender, angular peduncle.

The fruits are semi-ovoid in shape, with a narrow rim, and valves scarcely exserted.

E. STUARTIANA F.v.M.

Apple Box

Apple of Victoria

The original description of this tree was made by von Mueller in his *Eucalyptographia* published in 1879, and the specific name given by him in honour of Charles Stuart, a collector, who contributed largely to his herbarium from Tasmania and New South Wales.

It has been revealed by the researches of Baker and Smith that certain trees formerly referred to this species are now known to differ from the type in such important features as oil-content, oil-character, and quality and colour of timber. The revisers' claim, therefore, that such trees be separated under the specific name of *E. Bridgesiana* appears to be justified.

If such differentiation be accepted, *Stuartiana* may be described as a large tree with a red-coloured stringy bark and a pale red-coloured timber lacking durability. Its habitat is restricted to confined areas in Victoria just east of Melbourne.

The juvenile leaves are glaucous, sessile, and nearly circular. The normal leaves of the tree are about six inches long, lanceolate in shape, of equal colour on both sides and with oblique, spreading venation.

The flowers are generally arranged in umbels of about seven.

The fruit is small and nearly hemispherical, sessile on a decided, flattened peduncle, with a well-defined rim beyond which the valves are exserted.

E. ALBENS Miq.

White Box

Synonym: E.hemiphloia var. Albens F.v.M.

Von Mueller insisted that this tree was only a variety of his Grey Box (*E. hemiphloia*), and stated that the name *albens* arose through a misreading of the word *pallens*. If that be so, it is a fortunate accident that the chance title (originated in 1856 by Miquel, a Dutch botanist) is so appropriate, for a distinguishing feature of the tree is the white bloom that covers the young branchlets, buds and fruit. Further, the tree has a decidedly pallid or whitish appearance.

It is difficult to deny specific rank to this tree, as the two can hardly be confused in the field. The constant *bloom*, larger buds, larger fruits and differing timber are features that support a different general appearance and foliage.

Grey Box (*E. hemiphloia*) is a species of more than ordinary distribution as it ranges over great tracts of country in four states, whereas White Box (*E. albens*) is a dry-country form of limited habitat. It has so far only been reported from a small area in South Australia, a more extended area in Victoria and southern portions of New South Wales—all localities being significantly distant from the coast.

The bark is of characteristic box or lizard-skin type. The upper branches are smooth and white with bloom.

The leaves are broad to lanceolate.

The buds are arranged up to seven on a flattened peduncle, and have conical opercula that are often umbonate.

The fruits are long, truncated ovoid, faintly ribbed, with inserted valves, and glaucous.

E. MACULOSA R.T.B.

White Brittle Gum

This is a moderate-sized tree rarely exceeding sixty feet in height. It is a "newer" species, having been put forward as worthy of specific recognition by R. T. Baker in 1899.

The name was chosen in allusion to the spotted nature of the bark —the general appearance resembling true spotted gum (*E. maculata*), although the two trees have not yet been found growing in the same localities.

Varying shades of grey, yellow, and blue tones are caused by the casting off of the bark in small patches so that a mottled and beautiful appearance is presented.

It is found in many parts of New South Wales, where it favours cold mountainous districts, or less frequently damp positions, where it is apt to present variations from the type. In Victoria it occurs in Gippsland, and across the northern side of the Dividing Range to the edge of the Western District plains.

It bears general resemblance to *E. haemastoma*, but lacks the characteristic insect scribbles of that species. It also has affinity to *E. rubida* and *E. viminalis*.

The juvenile foliage is opposite and ovate. The normal leaves are thin and narrow, alternate, of dull surface and equal colour on both sides.

The umbel is composed of from four to sixteen flowers, shortly pedicellate on a slender peduncle.

The fruits are hemispherical and domed with the valves slightly exserted.

E. POLYBRACTEA R.T.B.

Blue Mallee

A MALLEE tree prevailing over large areas in south and south-western New South Wales and the northern parts of Victoria. Since the publication by R. T. Baker in 1900 of the description of its botanical details it has been differentiated from the Mallees *E. fruticetorum* and *E. viridis*, and accepted as a species of the genus.

It is of commercial importance, as it is the source of the bulk of the high eucalyptol content oil that finds its way to the world's markets. Old leaves and branchlets yield about 1.5 per cent of oil and younger leaves and sucker growth approach to 2.5 per cent. Such oil contains about 80 per cent of eucalyptol—a substance of complicated molecular construction that has distinct prophylactic and bactericidal properties. The name cineol is synonymous with eucalyptol.

The tree is a typical Mallee with several boles arising from the subterranean trunk. Trees twenty-five feet high would be conspicuous in the surrounding vegetation. Its specific name is in allusion to the many bracts found on the inflorescence.

The leaves are narrow lanceolate, about three inches long, rarely falcate and not oblique, and with the midrib raised on the underside.

The fruit is small, pyriform to hemispherical, with a sharp contracted rim. The valves are deeply inserted.

E. UNCINATA Turcz.

Hooked Mallee

Synonym: E. desertorum

The first morphological description of this Mallee appeared in the *Bulletin* of the Moscow Naturalists' Society in 1849, by Turczaninow, who is thus the author of the species. The name has allusion to the number of leaves that terminate in a slender hook.

It occurs as a shrubby tree in the Mallee areas of Western Australia, South Australia, northern Victoria, and southern New South Wales. A normal height is ten feet, although in favourable localities it may attain twenty feet.

In characteristic Mallee fashion several stems only a few inches in diameter arise from the "Mallee root," or true bole, below the surface. The mature leaves are narrow lanceolate, about three inches long and $\frac{1}{2}$-inch wide. The broader, opposite and sessile leaves of the seedling frequently persist to maturity—a feature shared with a few other species of the genus. (Cf. *E. cinerea.*)

A character of this species is the peculiarity of the filaments to be flexed even when the flower is fully open.

The fruits are small, globular, or pear-shaped with a definite rim, and the valves level or just exserted.

E. CAMPHORA R.T.B.

Sallow Gum

SYNONYM: E.OVATA VAR. CAMPHORA

THE author of this species, R. T. Baker, claimed in 1900 that the differences between it and Swamp Gum (*E. ovata*) were such as justified its recognition as a species. The chief points of distinction are indicated as occurring in the leaves, fruit, and timber.

The type comes from a few inland districts of New South Wales, but the tree has since been reported from the South Coast areas and also from parts extending well into Victoria.

Like its congener, *E. ovata*, it always prefers wet localities like swamps and creek-banks, where it may grow to an umbrageous tree 100 feet high.

The leaves are similar to Swamp Gum (*E. ovata*).

The fruit is also similar in shape but inclined to be larger, more pedicellate, and with the valves much more exserted.

The variation of the essential oils from the two species may be shown by the following figures:

	E. ovata	*E. camphora*
Yield, per cent	.24	1.34
Sp. Gr.	.9056	.9071
Percentage of Eucalyptol	23	50
Rotation	+10°	+1.3°
Refractive Index	1.4716	1.4676

E. ROSTRATA Schlect.

Red Gum

River Red Gum

On the banks of creeks and rivers and on alluvial formations throughout the length and breadth of the mainland of Australia the magnificent Red Gum occurs. It is probably the most widely distributed species of all the eucalypts, despite the fact that it has not been found in Tasmania.

When growing on the richer plains it develops a spreading habit and attains great size. On river-flats where it may be subject to annual flooding the prolific germination of the seed results in dense growth that produces tall and straight trees. A trunk diameter of fourteen feet has been recorded.

The bark is smooth and clean, of a grey-blue colour, generally showing large patches of a lighter colour where recent decortication has taken place.

The leaves are usually lanceolate or linear-lanceolate in shape, falcate, thin and flexible, and of equal colour on both sides.

The fruit is always hemispherical or globular on a slender pedicel. The rim is distinct, either flat or oblique, and the valves are much exserted. The operculum is often larger than the calyx-tube and is prominently rostrate.

The hard, dense wood of irregular and interlocking grain is famous for its durability above or below ground, and many instances of long resistance to decay are recorded. About two years ago engineers constructing a bridge over the Yarra at Melbourne were much hampered by a vertically-placed log encountered at the bottom of their foundations. When ultimately dislodged it was found to be the trunk of a primeval red gum. It was eighty feet below sea-level and below the basalt flow. Geologists estimate its growing period to have been about 250,000 years ago, yet the wood to-day, although darkened in colour, has every characteristic of freshly-seasoned wood, even portions of the bark adhering in perfect preservation.

The species was described in 1847 by Schlechtendal and named in allusion to its bird's beak operculum. The vernacular name refers to the red timber.

The specimen illustrated was taken from a tree growing naturally on the banks of the Yarra River within half a mile of Prince's Bridge, Melbourne.

E. TERETECORNIS Sm.

Forest Red Gum

The story of this species is inextricably involved with that of Red Gum (*E. rostrata*). It is by far the older of the two, having been described in *Specimen of the Botany of New Holland* published in 1793 by J. E. Smith to whom the specific name was suggested by the long, cylindrical operculum. The author states that the lid is always polished, is three times as long as the calyx-tube, and often breaks off above the base leaving a loose ring about the calyx. Whilst these features are not constantly present, they form a guide to identity in some instances. *Teretecornis* and *rostrata* merge into one another to such extent that many intermediate specimens may be referred with equal justification to either type. Yet the types or extremes are sufficiently different to warrant the acceptance of both as species which record definite phases in the evolution of the genus.

The main comparative differences are that *teretecornis* has less oil-content, much denser wood, rounder juvenile leaves and a longer operculum than *rostrata*. The operculum of *teretecornis* varies from long-rostrate to long-ellipsoidal whereas *rostrata* is constantly of bird beak's pattern.

In habitat the species ranges from the eastern half of Victoria throughout the whole coastal area of New South Wales to northern Queensland. It also extends to Papua, being notable as one of the few species found outside the mainland of Australia.

Apart from the confusing application in a few districts (especially Queensland) of the vernacular name Blue Gum, it is known generally throughout its range as Red Gum. This is qualified by "forest" to denote its preference for forest lands in association with other species in contrast with the isolated growth of *rostrata* on river-banks and undrained swamps.

It grows to a height of 150 feet but is often only a moderate-sized tree. The trunk and branches are smooth and grey-blue in colour with patches or whorls of paler colour caused by decortication.

The buds are in umbels of about nine, on long terete or flattened peduncles.

The fruit is hemispherical to round, with a domed top and much exserted valves.

The timber is dark red in colour, hard and dense, and of proven durability for all purposes.

E. DIVES Sch.

Blue Peppermint

Broad-leaf Peppermint

SYNONYMS: E.AMYGDALINA VAR. DIVES F.v.M.
E.AMYGDALINA VAR. LATIFOLIA DEANE & MAIDEN

THE first description of this tree was made by Schauer, the Viennese botanist, from specimens collected in 1822 by Allan Cunningham from the "forest lands north of Bathurst," New South Wales.

The name was no doubt suggested by the leaves being markedly rich in oil. This feature is shared with its affinity *E. Australiana*, the yield of oil from both species approaching 3 per cent in the spring season. The common name, Broad-leaf Peppermint, is in general use, but Blue-leaf Peppermint is given precedence in deference to the decision of the Victorian Plant Names Committee—chosen in allusion to the blue-green foliage.

The habitat is now known to embrace large areas in south and west New South Wales and Gippsland and north-eastern and western areas in Victoria.

The tree is immediately recognized as a Peppermint by the smell of the bruised leaf, its distinction from other members of the group being made by reference to the juvenile foliage, character of oil and timber. It is also noted that this tree is prone to flower at a very early stage of growth, even before the transformation of the leaves from opposite and sessile to alternate and petiolate is complete.

The bark is of that peculiar character known as peppermint which lies midway between typical box and stringybark.

The juvenile foliage is ovate-cordate and sessile, notably large and broad. Mature leaves are broadly lanceolate and thick in texture. The conspicuous venation spreading from the base of the leaves is a specific feature.

The buds are very numerous, as many as twenty forming the umbel. They are clavate and often glaucous.

The fruits are hemispherical to pyriform, with a thick rim, flat or slightly domed, above which the valves may protrude a little.

The timber is so interspersed with gum-veins as to be worthless in comparison with that of *E. Australiana*, which seasons well and is used for tool handles.

The oil contains 40 to 50 per cent of piperitone, a substance that has commercial value for chemical conversion into thymol, the characteristic constituent of oil of thyme.

E. CINEREA F.v.M.

Argyle Apple

Mealy Stringybark

MUELLER, in his *Eucalyptographia,* published in 1879, described and depicted under the name *E. pulverulenta* a tree which is now recognized as *E. cinerea.* It is a distinctive species whose identity is quickly revealed by the ovate or cordate foliage which is very glaucous and almost always sessile and opposite. On rare occasions does the foliage become lanceolate on a short petiole, but as a rule the tree reaches maturity, as evidenced by its flowering and fruiting, with the stalkless leaves that in most eucalypts are a character of adolescence.

The glaucous leaves somewhat resemble in shape an apple-leaf, and as the tree occurs freely in the county of Argyle, New South Wales, it is commonly known as the Argyle Apple.

The bark is markedly stringy or fibrous, which feature, in conjunction with the notable bloom on the buds, fruit and foliage, gives rise to the other common name of mealystringy bark.

The specific name is suitably suggestive of the ashen-grey appearance that the prolific bloom causes the tree to present.

The habitat may be defined loosely as the upper Murray districts of northern Victoria and southern New South Wales.

The flowers are small, and occur in umbels of one to three on short pedicels with a short round or slightly flattened peduncle.

The fruit is hemispherical or shortly pyriform with a thickened rim and domed ovary beyond which the valves are but slightly exserted.

E. CINEREA var. MULTIFLORA J.H.M.

Silver-leaf Stringybark

Although only formally recognized as a variety of *E. cinerea*, this tree presents greater difference to the type than exists between many "official" species.

From the eastern suburbs of Melbourne through the whole expanse of Gippsland to well into New South Wales this tree may be found in abundance—and especially in those places where the soil is not of the richest quality.

Generally it is a small tree of about forty feet in height and a trunk diameter of twelve to eighteen inches, but occasionally fine spreading specimens of double these dimensions occur. Better soil or proximity to a watered garden often accounts for such improved growth.

Young trees and the sucker shoots of damaged or pruned trees display the prominent glaucous bloom of the type and opposite, sessile, ovate or cordate, leaves, but in contra-distinction to the type the foliage changes with age to the dull green, alternate, petiolate, lanceolate form associated with so many full-grown eucalypts. The leaves are frequently falcate with faint obliquity.

The bark is dark grey in colour, of decidedly fibrous texture, but softer than most stringybarks. It extends well up on the branches.

The flowers are individually small, but their tendency to profusion is noted in the varietal name. They are arranged in umbels of three to seven on a slightly flattened peduncle.

The fruit is hemispherical and domed with slightly exserted valves.

The tree is very amenable to pruning, and the young growth resulting from such treatment has very beautiful grey-green foliage. The natural young growth of mature trees presents in spring, and in a lesser degree in autumn, tones of colours ranging from silver-grey to purplish-red.

E. EUGENIOIDES Sieb.

White Stringybark

SYNONYM: E.SCABRA

THIS important tree was first described in 1827 by Wilhelm Sieber, a visiting Austrian botanist, who remarked in the specific name he adopted a similarity between its rich green, full foliage and that of the *Eugenias*. The leaves of this species serve as some guide to its identity, as in the juvenile state they are ovate-lanceolate, shortly petiolate and undulate, covered with stellate hairs, and in maturity they are lanceolate, of dark green colour and shiny on both sides.

The tree is widely distributed over the coast and tablelands of eastern Victoria, New South Wales, and southern Queensland, and is known throughout the area almost solely as White Stringybark.

The bark is characteristically stringy and fibrous in texture to such extent that it is preferred for roofing purposes, and has been teased and spun to make serviceable cordage.

The buds number from four to twenty in an umbel, and when young are frequently arranged in symmetrical stellate design. The flowers are crowded and give place to small truncate globular fruits which are almost sessile and crowded into a fairly regular sphere on a long, slender peduncle.

The fruit has a definite rim, frequently red-coloured, beyond which the valves are rarely exserted.

Whilst the tree freely occurs in poor localities, in better soils it attains considerable dimensions, and is then sought after by saw-millers. The timber is brownish when cut, but dries paler in colour. It is valuable for all constructional purposes, and has great durability underground.

E. MACRORRYNCHA F.v.M.

Red Stringybark

Both from the aspect of utility and general distribution this is one of the most important stringybarks, and fortunately has fruits of such distinctive character as to be easy of identification.

The species was named by von Mueller in 1853 in reference to the "big nose" of the operculum, which is always prominent and sometimes slightly twisted in an unmistakable manner.

The home of the type is Victoria, where it occurs widely distributed even up to altitudes of 3000 feet, but it also occurs over the whole tableland and dividing range of New South Wales and near Adelaide, South Australia.

The tree grows to considerable size, and is covered by a persistent, fibrous, and rather deeply furrowed, grey-coloured bark. To the earlier settlers, and even to-day, the bark is of value for roofing and building purposes, in which uses it has surprising durability.

The leaves are usually about six inches long and about an inch wide, of equal grey-green colour on both sides.

Four to nine flowers occur, almost sessile, in an umbel on a long, slender peduncle which is often angled.

The fruit is comparatively large and so domed above as to be oblately spheroidal in shape. The rim is well defined and the valves are exserted.

Whilst generally known as stringybark it is, by reason of its timber, generally qualified as red to distinguish it from its congener, the brown stringybark (*E. capitellata*).

The species is prone to display a pendulous habit. In the Riverina district many specimens of as pronounced "weeping" character as the Willow may be found.

E. ELAEOPHORA F.v.M.

Long-leaf Box

Bundy

SYNONYM: E.CAMBAGEI

THE original description of *E. goniocalyx*, published by von Mueller in 1859, clearly reads as applicable to two trees alike in all morphological characters but differing in one being a giant smooth-barked tree and the other of moderate height and box-like bark. In 1863 the same author published a description of the smaller tree under the name *elæophora*, the significance of which title—meaning "olive bearing"—is not easily apparent. The vernacular name of Long-leaf Box is quite suitable, as the trunk of the tree is clad with a bark of box-like character, and the leaves of the tree are notably long, as in the case of its affinity, *E. goniocalyx*.

The foliage gives the general impression of being long, and the individual leaves of graceful, lanceolate form will range from eight to as much as twenty-five inches long.

The buds are of characteristic elongated ovoid shape and generally show from one to four faint angles. They are arranged in umbels of five to seven, without pedicels, on a thick, flattened peduncle.

The fruits are truncated ovoid in shape, with a narrow rim beyond which the valves are rarely exserted. The valves are either three or four in number. On very rare occasions peculiar two-valved fruits have been found, but these may be regarded as an abnormality. The fruits usually display the longitudinal ribs or angles that are characteristic of the species.

The type comes from Victoria, where the tree is generally well distributed. It also ranges into South Australia and to the whole length of the tablelands and mountains of New South Wales.

E. REGNANS F.v.M.

White Mountain-ash, Giant Gum, Blackbutt

SYNONYMS: E.AMYGDALINA VAR. REGNANS
E.AMYGDALINA VAR. COLOSSEA
E.INOPHLOIA

FOR almost exactly one century this monarch was regarded as a Peppermint (*E. amygdalina*). Its claim to be a distinct species appears to have been made by the colossal specimens found growing in the high-rainfall mountain areas of Gippsland, Victoria. The magnitude and distinct characters of these trees first led to their being denoted as a variety of the species, and culminated in Ferdinand von Mueller raising them to specific rank in 1887, under the well-chosen title *Regnans*.

Trees that clothe a mountain-side with clean, straight, and limbless columns of a hundred and fifty feet, that support a light and airy canopy at twice that height above ground-level may, most reverently, be considered the reigning monarchs of the vegetable world, so the specific name is both descriptive and venerable.

The tree occurs in Tasmania, New South Wales, and Victoria, but it is in the last state that the largest specimens have been found. Exaggerated heights have been ascribed to these specimens; the maximum recorded height that can be regarded as reliable is 326 feet.

The branches and barrels of these giants are smooth and clean, but about the base fibrous, rough bark persists, which feature gives rise to the use of the popular name Blackbutt in some districts.

The flowers are quite small, covered in bud with hemispherical opercula. The umbels are mainly single, but frequently two arise from the same axil. This is a most helpful guide to identity.

The leaves are elongate to lanceolate, frequently falcate with numerous oil-dots showing when held to the light.

The fruits are small and hemispherical to semi-ovoid, containing seeds that are impressively small for the size of the tree.

The timber is of the greatest value. When used green for the cruder forms of carpentry it is known as "hardwood," but when seasoned, either naturally or artifically, it is worthy of the finest craftsmanship of joiner or cabinet-maker. It is then usually known as Mountain Ash, or ignominiously bears the trade name of "Australian Oak"—a false and misleading term.

The wood is in the main exceptionally fissile and straight-grained, but damage to the young tree by fire or falling branches causes much figure of "fiddle back" character that, in moderation, is a distinct embellishment to panelling or furniture.

E. GONIOCALYX F.v.M.

Mountain Gum

When this tree was first described in 1850 by von Mueller the species embraced the tree now know as *E. elæophora* or Bundy. The two are alike in all morphological characters but differ greatly in their barks and ultimate heights. *E. goniocalyx* is essentially a tree of mountain-sides and luscious bottoms, where it attains a size comparable to *E. regnans*. It thrives at altitudes up to 3000 feet, and produces a pale-coloured fissile timber hardly distinguishable from that of *regnans* and of equal economic worth.

The seedling bears great resemblance to *globulus*, which together with its clean, smooth trunk causes it to be known to many saw-millers as Blue Gum.

The specific name has allusion to the ribs or angles that occur on the flower calyx and persist in the fruit.

A notable feature of this tree is the great length that its graceful lanceolate leaves attain. Leaves twenty-four inches long by about two inches wide are not uncommon, and twenty-seven inches has been reliably recorded. They have equal colour on both sides.

The fruit is truncated ovoid in shape, three to seven being set almost sessile on a thick, flattened peduncle. Two or four prominent ribs run longitudinally on each fruit. The rims are thin and the valves level or but slightly exserted.

E. VIMINALIS Labill.

Manna Gum

Ribbony Gum

White Gum

THIS species vies with Red Gum (*E. rostrate*) in its wide distribution. The type came from Tasmania, and was named by Labillardière in 1806 in allusion to its "twiggy" character, which evidently impressed him as a notable feature. Since those days it has been recorded from South Australia, including Kangaroo Island, Victoria, New South Wales, and southern Queensland.

It grows to huge trees in areas of good soil and high rainfall, but accepts comparatively poor, sandy conditions and great extremes of altitude, ranging from sea-level to 4000 feet. In mountainous localities it becomes a noble tree with such a clean, white barrel that it is frequently known as White Gum, although the seasonal shedding of the bark in long ribbons earns it the name of Ribbony Gum. But the happiest popular name that remarks a character shared by few other species is Manna Gum on account of its exudation of a sugary substance colloquially known as manna. Its love of river-banks and lake-sides also accounts for it being referred to less often as River Gum.

The white powdery bark of the tree makes it conspicuous and very beautiful in forest settings, but it is a puzzling and intriguing species leading, as it does, a Jekyll and Hyde existence, and occurring in many coastal areas clothed with a rough bark almost to the tips of the branches. It is prevalent in the latter form on the sandy shores of Port Phillip, where it departs entirely from its erect habit and assumes a comparatively low, umbrageous growth.

The most helpful guide to its identity is the young buds which occur most frequently in threes on the peduncle set in precise cruciform arrangement—although occasionally they number up to seven.

Long narrow leaves with irregular veins, globular or semi-ovoid fruits with a decided rim and exserted valves are confirmatory features.

It bears great affinity to "candle-bark," *E. rubida*, but may be separated by its seedling and sucker leaves. In *viminalis* they are linear-lanceolate and bright green. In *rubida* they are ovate-cordate and grey-green.

The foliage is a food preferred by koalas before that of surrounding species.

E. RUBIDA Deane & Maiden

Candlebark

SYNONYMS: E. MANNIFERA
E. GRANULARIS

THE specific character of this tree was indicated by von Mueller in studying the collector's notes on *E. Stuartiana*. It remained, however, for Deane and Maiden to formally describe the type in 1899 and to adopt a name suggestive of the reddish or plum-coloured patches that frequently occur on the bark. As a rule the bark is perfectly smooth and so white and waxen in appearance as to suggest a tallow candle. The outer bark is cast in long ribbons. Frequently the base of the tree is clad with scaly and ruddy-coloured bark, more especially those specimens growing in well-watered positions.

The type came from dry hill-sides in southern New South Wales, but it occurs in that state to the southern border and into Gippsland, Victoria. Many fine specimens are to be found in the Yarra valley and in the Mount Lofty Ranges near Adelaide.

The tree has close affinity to *E. viminalis* (Manna Gum), and is difficult of distinction except by reference to the juvenile foliage. In *rubida* it is ovate-cordate and grey-green—in *viminalis* it is linear-lanceolate and bright green. As in *viminalis* the frequent occurrence of the young buds in a symmetrical cruciform arrangement of three is the first clue to identity.

The mature leaves are dull green, equally coloured on both sides, lanceolate and pendulous.

The fruits are truncated globular or turbinate with a broad rim and convex top in which are three or four valves slightly exserted.

It shares a characteristic with *E. viminalis* in producing manna especially during prolonged dry seasons.

The timber is of a pale pinkish colour, and said to be worthless excepting for firewood, but nevertheless is put to considerable use in the districts where the tree grows.

E. MAIDENI F.v.M.

Spotted Blue Gum

A BLUE GUM reported from inaccessible areas in southern New South Wales and eastern Victoria was accepted for some years as being an aberrant form of the well-known *E. globulus*. Persistence on the part of the collector, W. Baeuerlen, in transmitting specimens to von Mueller resulted in 1890 in that authority publishing a full description and according it a specific name in honour of J. H. Maiden. A few years subsequently A. Kinney, an enthusiastic grower of gum-trees in California, raised from imported seed, apparently by chance, a tree of hitherto unrecognized features. This he christened *E. Mortoniana*, but his tree is found to be referable in every respect to *E. Maideni* and, the earlier name taking precedence, the Californian name can only be recorded as a synonym.

E. Maideni has affinity to both *E. globulus* and *E. goniocalyx*, especially in its size, trunk, foliage and appearance, but can be sharply separated from either by its fruits, timber, and juvenile leaves.

The trunk is tall, smooth and chalky-white or bluish in appearance.

The young leaves are very large, round or cordate and glaucous. The normal leaves are very long, thick and falcate.

The young branchlets are angular and the opercula obtuse or umbonated and frequently verrucose.

The fruit is much smaller than *globulus*, semi-ovoid or hemispherical in shape, on a short, flattened peduncle, with a broad rim and convex ovary in which occur three to five valves much exserted.

E. MUELLERIANA Howitt

Yellow Stringybark

Synonym: E.pilularis var. Muelleriana

The yellow stringybark of the Gippsland forests, Victoria, provides a wood that is famous for its durability under all conditions, especially as posts and piles. It is recorded that wharf-piles that had been submerged in sea-water for more than thirty years were perfectly sound and in excellent condition. It is also largely used for flooring and weatherboards.

The species forms forest growths in large areas of Gippsland in south and east Victoria where it is abundant. It has also been recorded from southern New South Wales and Mount Lofty, South Australia, but its high development into large trees of 150 feet high is confined to Gippsland.

The tree has affinity in appearance and fruit morphology to Blackbutt (*E. pilularis*), and was recorded as a variety of that species by Maiden in 1903 but raised to specific rank by him in 1907. The original description was published in 1890 from extensive field-knowledge by A. W. Howitt who honoured Baron von Mueller in the name he chose.

The bark is characteristically stringy right up to the smaller branches. The under bark generally shows a yellow colour on being exposed which serves as a distinguishing feature to *E. pilularis*. The timber also is more decidedly yellow than Blackbutt.

The author states that a marked feature of the species, and one that distinguishes it from other stringybarks, is the tendency of the saplings to hold their leaves in a horizontal position.

From three to sixteen buds form an umbel on a peduncle that is shorter and stouter than in *pilularis*. The umbels are usually solitary and tend to be terminal, thus forming a panicle.

The fruit is truncated globular to semi-ovoid, with a rim flat or slightly domed in which are usually four, or occasionally three or five, valves protruding slightly or not at all.

E. KITSONIANA Lueh.

Gippsland Mallee

Flat-root

The extensive area of Gippsland, Victoria, is conspicuous for the large eucalypts that populate it and probably contained, before the entry of the white man, the tallest trees in the Empire. In characteristic paradoxical manner set amongst the giants occurs the Flat-root—a true eucalypt but of dwarf dimensions and shrubby habit, entirely lacking the strong and sturdy bole of its congeners near by. It occurs on the poorer soils and wet places and rarely exceeds twenty feet in height. It displays the habit of the Mallees, from which it is separated by hundreds of miles, by producing a large, spreading butt level with the ground from which arise many slender, smooth-barked shoots.

The juvenile leaves are very broad and oblong, almost sessible, with the veins prominently marked. In maturity the leaves tend to become lanceolate and petiolate, but the flowering stage is generally attended by leaves of immature character.

The buds are distinctly clustered in umbels of three to seven, with hemispherical or slightly umbonated opercula.

The fruit is sessile on a round or angled peduncle—generally conical or hemispherical in shape with three, four, or five valves level with the distinct rim or only slightly exserted.

The species was named in 1904 by J. G. Luehmann, the curator of the National Herbarium, Melbourne, in honour of A. E. Kitson, a geological surveyor in Victoria.

E. SIEBERIANA F.v.M.

Silver-top

Mountain Ash

Yowut

Gum-top

In earlier times certain confusion existed regarding this species, but its inclusion in von Mueller's *Eucalyptographia* of 1879 accorded it a specific rank that later field-observations have justified. The name is in honour of Wilhelm Sieber, a Viennese botanist, who visited this country on a collecting tour in 1823.

The tree suffers from a host of vernacular names, of which Silver-top is that selected by the Plant Names Committee of Victoria. It, and Gum-top, have allusion to the habit of the tree to present the upper branches clean and white in contrast to the dark, furrowed, and rugged bark of the trunk. Yowut is an aboriginal name, and Mountain Ash refers to the splendid timber produced by the species when growing on elevated mountainous sites in Tasmania and Victoria. In such localities the tree attains great dimensions, but over an extensive range from Tasmania to northern New South Wales a depauperate form occurs on lower coastal areas of poor soil conditions.

The trunk is usually clothed with a heavy, rugose bark which in contrast to *E. obliqua* is more scaly and less fibrous.

The leaves are coriaceous and shiny, lanceolate in shape, and frequently falcate, with the venation more oblique than usual.

The fruit is distinctly pyriform with a flattened or depressed rim and three to five cells. It varies from being faintly to definitely pedicellate, on a long peduncle which is flattened or angled.

The fruit dries with a shiny surface. This feature, taken in conjunction with the definitely clavate form of the young buds, and a unique ocellate appearance of the fully-opened flower, are most helpful guides to the identity of the species.

E. AUSTRALIANA R.T.B.

Common or Black Peppermint

Synonym: E.amygdalina Labill. var. Australiana R. T. B.

In 1792 Labillardière collected in Tasmania specimens of a eucalyptus he named *amygdalina* in 1806, owing to some resemblance he saw in its foliage to that of the almond-tree. Seeds of the species were distributed world-wide, as it thrived well in a fair range of climate, and quickly earned a reputation for anti-malarial properties. Its cultivation in many lands gave rise to its frequent description by botanists abroad, who each bestowed upon it different specific names, with the result that the species has an elaborate and confusing synonymy. No good purpose can be served by their repetition here and they were best forgotten.

For over a century the common peppermint of Tasmania, Victoria, and New South Wales was referred to the tree named by Labillardière *E. amygdalina.* During that time closer field-knowledge caused several new species to be separated, and such types as *regnans* and *radiata* are now recognized as specifically different trees. A research into the eucalypts of Tasmania by R. T. Baker and H. G. Smith, together with a critical analysis of their oils, caused them to differentiate a new type to which they gave the name *Australiana.* It will lessen confusion if their suggestion that the name *amygdalina* be restricted to the original Tasmanian type and the name *Australiana* be adopted for the *different* tree of the mainland.

E. Australiana ranges in open and hilly country over Victoria, New South Wales, and South Australia. It is a moderate-sized tree with a light-coloured bark, midway in texture between a stringy and a box bark.

The fruits are small and globular, occurring in umbels containing up to thirty. A well-defined rim is a feature distinguishing it from the Tasmania tree. The valves are never exserted.

The leaves are narrow, lanceolate and falcate. They contain a large amount of oil, the strong peppermint odour of which is a first clue to the identity of the tree.

103075

E. RADIATA Sieb.

River White Gum

SYNONYM: E.NUMEROSA

THIS species was originally described by Sieber in 1825 and named in allusion to the radiating character of the many buds which often present the form of a nearly complete sphere. In this feature it suggests its close relationship to the peppermint group of which *E. Australiana*, *E. dives*, and *E. regnans* are prominent members.

The species has had a confusing career since its foundation, being announced as *E. amygdalina* var. *radiata*, *E. amygdalina* and *E. numerosa*, but a survey of the morphological and physical properties as elucidated by Baker and Smith and an extended field-knowledge all point to the soundness of perpetuating the name of its original author.

The tree is a moderately large one, favouring the banks of rivers or creeks in New South Wales and Victoria.

The bark is of peppermint type at the base and smooth and white above.

The leaves are narrowly lanceolate, flexible and distinctly petiolate.

The young clavate buds are a guide to identity in their great number, as many as forty occurring on a slender, terete peduncle.

The fruits are small and pilular, or so merging into a slender pedicel as to be turbinate. They have a distinct rim above which the valves are not exserted.

E. OBLIQUA L'Hér.

Messmate

Messmate Stringybark

PARTICULAR interest attaches to this species, as it was the first introduced to the old world, and the one on which the whole genus was founded. In January 1777 the ships *Resolution* and *Discovery* were anchored for four days in Adventure Bay, Tasmania, and during that time Anderson, the botanist, and Nelson, his assistant, collected specimens of this tree. The material was lodged in the Kew Herbarium on the return to London, and there examined by L'Héretier de Brutelle, a visiting French botanist, in 1786-7. In the following year L'Héretier published his descriptions, using the word *Eucalyptus* for the genus and *obliqua* for the species in reference to the asymmetric shape of the leaf. The pleasant vernacular name Messmate is said to have arisen from the fact that it is usually found associated or "messmates" with other stringybarks.

The range of distribution is extensive. For over twenty years after its discovery Tasmania was not known to be an island separated from the mainland of New Holland. A consequence was that in subsequent botanical surveys of Tasmania the species was rediscovered and given other names such as *E. gigantea*, *E. elatus* and *E. fabrorum*, which have since been suppressed or allocated to other species. True *obliqua* is now known to inhabit Tasmania, South Australia, Victoria, and New South Wales almost to the Queensland border.

The bark of the tree is rough and fibrous to the ends of the branches, except in portions of Tasmania, where the branches are clean, and it approaches a Gum-top stringybark.

The leaves are broadly lanceolate; in the juvenile stage they are five inches wide and ten inches long. They are equally smooth and shiny on both sides, and although obliquity of leaf is characteristic of the whole genus, the feature is more universally displayed in this species than others.

The young buds are clavate, and three to sixteen form an umbel on a long, slender pedicel.

The fruits are small, pilular, or truncated ovoid in shape, with a depressed ovary and three to five inserted valves.

The timber is pale-coloured and fissile, so that it has long been used for split palings, posts and shingles. Trees in southern latitudes especially produce a timber that seasons well and is of extensive joinery application.

E. GLOBULUS Labill.

Blue Gum

Of all the eucalypts this species is the best known and most widely distributed both in Australia and abroad. Whole forests of it have been planted in California and South Africa, and it is the prevailing tree in Algeria and many parts of the Mediterranean coast. Fine specimens are growing in many gardens in the south of England.

It was found originally in Tasmania by Labillardière and described by him in 1799 in his account of the expedition sent in vain search of La Pérouse. In the early days of Australian settlement it was found also in Victoria and New South Wales, and whilst largely planted in all states it has not been found naturally growing elsewhere.

The stupendous tree yielding such valuable timber attracted great attention and its economic, scenic, and hygienic value caused it to be much planted in both the old world and the new. It has been supplanted as a source of medicinal oil by the abundant and more accessible Mallees.

Its high favour as a tree to form shelters and windbreaks has been threatened by the "fashion" of other species, but in many cases unfairly as for quick, certain growth, beauty of form and wood production it stands unchallenged.

The identity of the tree presents no difficulty. The seedling has round, sessile leaves with a heavy bloom that emits the strong smell of eucalyptol on being rubbed in the fingers. The young plant has angular branchlets and ovate, glaucous, sessile and opposite leaves. The adult leaves are petiolate, glabrous and lanceolate, accuminate up to fourteen inches long, falcate and oblique, presenting when perfect most graceful curves of outline.

The metamorphosis of leaf sets in at the top of the young tree which frequently shows for many months the transition stage with dark green leaves above and glaucous leaves below.

The fruit was originally described as globular—hence the specific name—but may be described better as pyramidal as it is generally angular with a domed or flattened top in which are the valves curiously ranging from three to seven. The young bud is warty, and the operculum warty and prominently umbonated.

The trunk is covered by a clean, smooth, blue-coloured bark which decorticates annually in long ribbons.

E. CORIACEA A. Cunn.

White Sallee

Cabbage Gum

Weeping Gum (Tas.)

SYNONYM: E.PAUCIFLORA SIEBER

THE first description of this species was made in 1824 by Allan Cunningham, who chose the title in allusion to the thick, leathery leaves that characterize it.

It has a confusing collection of common names as is usually the case with those species that have an extensive range of natural distribution. The tree occurs very generally in Victoria and Tasmania, in the southern portions of New South Wales and eastern South Australia. White Sallee is the name adopted by the Victorian Plant Names Committee. Cabbage Gum no doubt originates from the spreading habit of the tree, and Weeping Gum from the pendulous character of the Tasmanian trees. In its Victorian distribution it is remarkable in extending from sea-level to the highest altitudes of Mount Kosciusko, where it prevails under the local name of Snow Gum. It is probable that further observation and knowledge of the species will result in the coastal variety being recognized as a distinct species under the name *phlebophylla*, as the mountain type is observed to have shorter, straighter leaves, smaller flowers and shorter peduncles.

The type is a handsome, smooth-barked tree of pleasing shape and foliage.

The leaves are a helpful guide to identity, being lanceolate, coriaceous, and up to twelve inches long. They are prominently veined almost longitudinally, which distinguishes the species from many others. They are smooth, equally coloured on both pages, and sometimes glossy in surface.

The tree flowers heavily; five to ten florets on short pedicels constitute an umbel on a stout, terete peduncle. It is recorded that forty buds have been counted in an umbel.

The fruit is large compared to the flower. It is truncated ovoid or nearly hemispherical, with a decided rim and the valves flat or very slightly exserted.

E. RISDONI Hook.f.

Risdon Gum

Drooping Gum

Synonyms: E.hypericifolia R. Br.
E.amygdalina var. hypericifolia Benth.
E.connata Sch.

In the year 1803 a party of twenty-one souls made the first white settlement in the island of Tasmania. The site of the encampment was on the banks of the Derwent River, and the little colony soon became known as Restdown. By usage and corruption, in course of time, the name became Risdon and the camp a populous and industrial suburb of Hobart.

The beautiful gum-tree prevailing in the locality was noted by J. D. Hooker, surgeon to the *Erebus* and *Terror* expedition of 1839-41, and described by him with the place-name in 1847. The vernacular name Drooping Gum alludes to the usual pendulous habit of the tree.

Although showing close relationship to the peppermints both by the constitution of its oil and its morphological features, it clearly belongs to the "Gum" group, possessing a smooth and clean bark, mottled in irregular patches with greys, blues, and browns. The foliage is heavily glaucous and the young growth of great beauty both in form and colour.

The juvenile leaves are cordate and connate and, like *E. dives*, the tree frequently flowers and fruits before these leaves are transformed to the lanceolate, petiolate and less glaucous, adult form.

The buds are in umbels of six to twenty on a long, terete peduncle, heavily coated with a white powdery bloom.

The fruit is pyriform on a short pedicel with a well-defined rim sloping inwards to a flat top above which the valves are sometimes slightly exserted.

The tree is confined to Tasmania, but has been largely cultivated in Victoria, where it has proved itself a hardy and ornamental species for specimen or plantation purposes.

E. COCCIFERA Hooker, f.

Mountain Peppermint

SYNONYMS: E.DAPHNOIDES
E.CITRYANDRA

THIS species is confined to Tasmania where it occurs only on the tops of high mountains. It is abundant on Mount Wellington, near Hobart, at altitudes of 3000 to 4000 feet above sea-level.

It was first described in 1847 by J. D. Hooker who coined the specific name from the prevalence of a coccus on the foliage. This feature is now known to occur on many species, but the name is apt as the young branches are so peculiarly roughened with fine grains as to form a leading diagnostic character. In fact the bole of the mature tree is covered with a bark that is well described as coccus bearing.

It is stated that the tree rarely exceeds twenty feet in height. The specimen illustrated was taken from a tree about eighteen years old, cultivated in a Melbourne garden and only showing the petiolate leaves of maturity in recent years. The juvenile leaves are characteristically small and round, strictly opposite and sessile on the rough, glandular stalk. The mature leaves are small, coriaceous and lanceolate, frequently uncinate.

The buds are distinctly long and glaucous, and tapering to the base. They are surmounted by rough, shallow opercula that are often depressed in the centre in a manner unique to the species.

The sessile umbels contain up to six sessile buds which give place to large, broad fruits with domed tops.

The tree is a distinctive type, not likely to be confused in identity with any other species. It is too small to have any economic importance.

E. LINEARIS Dehnh.

White Peppermint

SYNONYM: E.PULCHELLA

WHILST the natural habitat of this tree is confined to Tasmania it is being much cultivated in Victoria, and thrives well in a fair range of climate and soil.

The identification of the species in the field presents little difficulty owing to a foliage that is almost unique in the whole genus. The mature leaves are rarely more than three inches long and $\frac{1}{4}$-inch wide, being rigid and so thick in texture as to conceal the venation with the exception of the midrib, which is prominent on the under-page only.

It is known that it was first described by the German botanist, Dehnhardt, about 1829, from specimens cultivated at Naples. It is believed that these trees were propagated from seeds collected from parents on the slopes of Mount Wellington near Hobart. In this locality the tree is abundant.

Natural and cultivated trees attain heights of about eighty feet with a smooth white or yellowish bark on the trunk and branches, and a characteristic scaly collar about the butt.

The fruits are small, round or slightly pear-shaped with a well-defined rim and inserted valves. They number five to ten, sessile, in the umbel, which has a peduncle about $\frac{1}{4}$-inch long.

The morphology of the fruit and the character of the oil borne by the leaves closely connect this tree with *E. amygdalina* and the whole of the peppermint group.

E. St JOHNI R.T.B.

Minor Blue Gum

Synonym: E.globulus var. St Johni

On the banks of the Lerderderg River, near Bacchus Marsh, Victoria, Mr P. R. H. St John discovered a smooth-barked *eucalyptus* which, while bearing close affinity to *E. globulus*, had certain differences which he considered specific. Accepted for some years as a variety of *E. globulus*, it was acclaimed as a distinct species by R. T. Baker in his *Hardwoods of Australia*, published in 1919.* The tree has since been discovered in other localities, all in Victoria, notably Mount Cole near Ararat, and south and east Gippsland.

The tree has a white and smooth bark, is slightly scaly at the base, and may attain a height of sixty to eighty feet with a trunk diameter of two feet. It favours the banks of streams, and in such positions, which are inconsistent with any depauperate form, it displays the typically small fruit and large leaves which differentiate it from *E. globulus*.

The immature leaves are characteristically large, being six inches long and five inches wide, and heavily covered with bloom. Mature leaves are elongate-lanceolate, up to sixteen inches long and two and a half inches wide, on a rounded petiole over two inches long.

The fruit is small and slightly verrucose, three at most forming an umbel, and then in cruciform arrangement with a short peduncle. They may also occur singly without peduncle.

The timber of the tree is notably different to *E. globulus*, being so short in texture and subject to shrinkage as to be worthless.

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* And confirmed in Maiden's *Critical Revision of the Genus Eucalyptus* (1929).

E. BEHRIANA F.v.M.

Bull Mallee

This species was named by von Mueller in 1849 in honour of Dr Herman Behr, a Californian naturalist, who collected specimens of the tree when travelling in South Australia.

Whilst it may be regarded as a true Mallee inasmuch as twenty stems may arise from the one root, and the tree is found in the semi-arid areas of South Australia, Victoria, and New South Wales, it may also occur of distinctly arboral habit in richer localities. On such occasions it may attain a height of thirty feet, but then exhibits a tendency to spread to an equal diameter.

In the Mallee areas, in company with other true Mallees, it appears as a shrub not more than ten feet high, with trunks only a few inches in diameter.

The vernacular name, Bull Mallee, appears to be based on its ability to dominate its congeners by assuming tree form. It is also known in certain localities as the Broad-leaf Mallee.

The trunk is smooth and dirty white in colour, excepting at the base, where it is brown and flaky.

The leaves are broadly lanceolate, thick, grey-green in colour and equally shiny on both sides.

The flowers are individually small, but occur massed together in terminal panicles. An umbel on a terete or slightly-angled peduncle will contain up to seven sessile florets.

The fruit is small, truncated ovoid in shape, flat topped, with a narrow rim beyond which the valves are not exserted.

As a commercial oil-producing Mallee the species is usually passed by distillers in favour of *E. polybractea* and *E. oleosa*, in whose habitat the species is usually found.

E. VIRIDIS R.T.B.

Green Mallee

Whipstick

Synonym: E.acacioides

In 1817 Allan Cunningham, the botanist accompanying the Oxley expedition, recorded *E. acacioides* in his own journal and distributed specimens to various herbaria. His failure to lodge an official description with the specimens deprives him of the authorship, and it was not till 1900 that a description was made by R. T. Baker under the name *E.viridis* in reference to the rich green, dense growth it usually presents

It has an extended range in the Mallee areas of New South Wales and Victoria, and presents the characteristic form of the subterranean bole with many slender stems arising to fifteen or twenty feet in height.

The leaves are peculiarly narrow and acacia-like. They are linear-lanceolate and occasionally uncinate, lustreless on both sides, and under six inches long.

The fruit is pilular, hemispherical or pyriform, with a thin, contracted rim and inserted valves. As many as ten may form an umbel with a short peduncle.

Owing to its peculiarly slender and flexible stems it is known in some localities as Whipstick or Whipstick Mallee.

Its leaves yield about one per cent of oil, but the character of the oil is such that it is in far less demand for pharmaceutical purposes than the product of several other Mallee species.

E. OVATA Labill.

Swamp Gum

Synonyms: E. androsemaefolia
E. mucronata
E. persicifolia
E. paludosa

The author of this species was J. J. Labillardière—a French botanist on the ships sent in search of La Pérouse—who first published a description in 1806. He recorded it as coming from "terra Van Leuwin," but on other specimens he writes "terra Van Diemen," and as the specimens are referable to a tree common to Tasmania and absent from Western Australia, it can safely be assumed that the first locality was given in error.

The species has a wide distribution, being plentiful in Tasmania, Victoria, South Australia, and New South Wales, and flourishing in cold, damp, undrained ground which may even be submerged annually for considerable periods. As a medium-sized tree it is a valuable addition to the landscape of poor, wet areas, and frequently attains the dignity of a large umbrageous tree.

The bark is smooth and blue-grey, becoming yellowish on the branches. Frequently the base of the trunk is clothed with coarse brown bark. A distinctive feature is the long ribbons of cast bark that hang from the upper branches and forks of the tree.

The juvenile leaves are conspicuously broad, sometimes nearly round and frequently obcordate. The mature leaves, which suggest the specific name, are ovate or ovate-lanceolate, and shortly acuminate and usually undulate.

The buds have short conical opercula, tending to be rostrate, and are almost sessile on stout terete peduncles.

The fruits occur in umbels of seven or less, and are characteristically conical in shape with a definite single or double rim. The valves are flush with the rim or only slightly exserted.

E. ALPINA Lindl.

Grampians Gum

The Mitchell expedition of 1836 that crossed the unknown lands of the vague Port Phillip district of New South Wales discovered this tree, and its peculiarities inspired the leader to record it in his diary. It was either chance or conscientious exploration that brought the knowledge of its existence to botanical science on the very first entry of white man to the vicinity of its very restricted habitat. On that occasion, nearly one hundred years ago, it was thought to be restricted to the summit of a single mountain, and since then the habitat has only been extended to the summits of a few adjoining mountains or in all the top of a single mountain range about forty miles long, now known as the Grampians, in the state of Victoria.

It was formally described and named by Lindley, professor of botany at University College, London.

It is a stunted tree of spreading habit and unique characters that can lead to no confusion with other species. On the foothills of the Grampians, Brown Stringybark (*E. capitellata*) is frequent, and it has been suggested that this is an alpine form of that tree, but it is difficult to reconcile the two species morphologically.

The bark is stringy; the leaves round, ovate or shortly lanceolate, thick and rigid, and equally shiny on both sides.

The buds and opercula are so verrucose as to be an irregular, warty mass which occurs laterally, quite sessile, as often as axillary.

The fruit is large and wooden, entirely sessile and verrucose. The rim is domed, and has four to six exserted valves.

By reason of its spreading, rather sturdy habit, the species has been used in windbreak plantations on the plains of western Victoria. It was recorded by von Mueller as being of very slow growth, but further experience has shown it not to be too slow for successful employment.

E. CLADOCALYX F.v.M.

Sugar Gum

SYNONYM: E.CORYNOCALYX

CONFUSION surrounds the specific name of this very popular tree. The facts are that in 1852 von Mueller described it from specimens collected on Marble Range, South Australia. He also records having been attracted by the tree when he crossed the Flinders Range in 1851. In the first description he gave it the name *cladocalyx*, evidently in allusion to the branch-like appearance of the calyx. Under the same name it was described in 1856 and again in 1857. In 1860 von Mueller republished a fresh description, using the title *corynocalyx* without explanation of the change. Despite the more descriptive character of the latter title (which means club calyx) the accepted rules demand that the prior name must stand.

The habitat of the species is South Australia, and more especially the shores of Spencer Gulf and Kangaroo Island. The record of its natural growth in western Victoria is of doubtful reliability.

In all parts of South Australia and Victoria it has been cultivated more extensively perhaps than any other species—particularly for windbreaks and ornamental shelter. Its popularity is due to its certain and rapid growth. Heights of about twenty feet in five years from the broadcasting of the seed are not uncommon. The timber is of value for rough constructional and fuel purposes.

The bark of the tree is smooth and generally much marked with yellow or brownish patches.

The leaves are lanceolate, acuminate, of equal sheen on both sides but slightly paler in colour below.

The species flowers and seeds most prolifically and at an early age.

The fruits are urn-shaped or elongate-ovoid with longitudinal ribs, a constructed rim and deeply inserted valves.

The club-headed flower-buds and abundant fruits of this species are ready clues to its identity.

The vernacular name arises from the fact that stock eat the foliage and first came into use at Wirrabara Forest, South Australia.

E. LEUCOXYLON F.v.M.

Yellow Gum

Yandert

In 1847 von Mueller bestowed this name (meaning white wood) upon the tree growing on the plains about Adelaide, South Australia, with the primary object of demarking it as different from the Red Gum, *E. rostrata*, with which it grew in company. In 1855 he published a description of it, recording its vernacular name as the White Gum Tree of South Australia. The type, therefore, comes from that state but the species has since been found to range in some abundance through Victoria into southern New South Wales.

The normal type is susceptible of considerable variation by the physical and geological conditions that support the tree. The main variations are apparent in the bark, size of the fruits, and the colour of the flowers.

The bark of the type is smooth and yellowish, with grey patches, but in restricted localities in South Australia, and in more extended areas in Victoria, it is covered with rough, dark bark that often persists right up into the tree. Such rough-barked trees generally occur on poorer formations, notably those that are gold-bearing. The occurrence of these rough-barked trees has given rise to the vernacular name of White Ironbark in some districts and caused confusion with E.*sideroxylon*.

The variation in the size of the fruits has caused a large-fruited variety to be separated, and trade demand and usage now recognizes a variety based on the colour of the flowers.

Constant features that run through all varieties are the long terete peduncles and long pedicels that gradually expand into the semi-ovoid fruit; also the long conical operculum that is frequently rostrate.

The mature leaves are lanceolate, acuminate, slightly falcate, and of equal grey-green colour on both sides.

E. LEUCOXYLON F.v.M. var. MACROCARPA

Large-fruited Yellow Gum

In all respects, save the colour of the filaments, this variety resembles the red-flowering tree, and invariably the two are found growing together in natural distribution.

It has been suggested that this tree approaches closer to the type of *E. leucoxylon* than *rosea* by reason of its smaller anatomical features, but the difference is not strongly marked. When not in flower the two trees cannot be differentiated.

E. LEUCOXYLON F.v.M. Var. MACROCARPA ROSEA

Red-flowered Yellow Gum

In 1859 von Mueller applied the varietal name *erythrostema* to the red-flowered variety of *E. leucoxylon* that was found in several coastal districts of South Australia. It was, however, pointed out by J. Ednie Brown, Conservator of Forests in that state, that a red- and cream-flowered tree that resembled each other in every other respect were growing promiscuously in the same localities. Accordingly, a name signifying red stamens was inapplicable. He observed further that these two differed from the type of *E. leucoxylon* in constantly producing much larger fruit. He therefore suggested the varietal name of *macrocarpa*, and since then the popular demand for the coloured form has caused the title to be amplified by *rosea*.

It is a beautiful and most ornamental species, thriving well in a fair range of soil and climate, and flowering at an early age with profuse and conspicuous blooms. It rarely attains a height exceeding thirty feet, and prefers a well-watered coastal position, but is brittle and unable to withstand high winds without damage.

The white- and red-flowered varieties are invariably found growing together, and the cause determining the colour has not yet been discovered. As in the case of *E. calophylla*, the progeny of a highly-coloured tree cannot be relied upon to reproduce the parental colour.

This variety occurs naturally at Port MacDonnell, near Port Lincoln, and Kangaroo Island, all in South Australia.

E. COSMOPHYLLA F.v.M.

Scrub Gum

Bog Gum

This is essentially a South Australian species, being restricted in habitat to the ranges near Adelaide, Encounter Bay, and Kangaroo Island.

Its usual habit is that of a large shrub, although occasionally it assumes tree form, and has even been recorded as a tree fifty feet high. The flowers are large and handsome, and make the species conspicuous amongst its smaller flowered neighbours.

It was described in 1854 by von Mueller, who coined its name from Greek words denoting the decorative and ornamental value of its leaves. The word "cosmos" in this case is used in the same sense as in "cosmetic."

It is locally known as Scrub Gum on the mainland, but its predilection for swampy positions on Kangaroo Island has given rise to the term Bog Gum.

The tree is usually too small for its red timber to have economic value, although it is reported that it has an exceptional durability in relation to its soft and easy working nature.

The leaves are thick and coriaceous, of dull green colour, ovate to broadly lanceolate and falcate in shape.

The flowers are large and arranged from one to five on a short, thick peduncle.

The fruits are barely pedicellate, hemispherical or truncated ovoid in shape on a decided, flattened peduncle. They become scaly on drying. A symmetrical cruciform arrangement of three is frequent. The valves number three to five, and are set below a definite rim beyond which they scarcely protrude.

E. CALYCOGONA Turc.

Slender Mallee

Red Mallee

In the low rainfall areas of New South Wales, Victoria, and South Australia that are clothed with the stunted eucalypts known as Mallees this species occurs interspersed with several other definite types of large shrubs or small trees.

Its most remarkable feature is the fruit which is developed by longitudinal ribs in such a manner as to present a square appearance. The rim of the fruit is round, and contains the deeply inserted valves. The fruits are sessile, or nearly so, and from three to seven form an umbel on a short, terete peduncle. The operculum is about one-third the length of the calyx-tube, and is shortly conical or pyramidal in shape.

The leaves are thick and coriaceous so that the venation it concealed —only the midrib being conspicuous.

The species was described by Turczaninow in 1852, and the specific name coined with reference to the angled calyx. The vernacular names quoted above are based on its general appearance. It is also said to bear the local name of Gooseberry Mallee in some districts.

Whilst several Mallees are of the highest commercial importance as a source of the most valued oils, Slender Mallee is comparatively unimportant. Its leaves yield about 1 per cent of oil, which contains only about 50 per cent of eucalyptol.

E. DIVERSIFOLIA Bonpl.

Sandal Gum

Synonym: E.santalifolia F.v.M.

The story of this comparatively rare species is a further instance of the amount of early investigation made into the trees of this country by scientists of foreign nations. The French "voyage of curiosity," commanded by Nicholas Baudin, that explored the southern coast of Australia in 1800 carried back to France the seeds of this tree from Kangaroo Island, South Australia. It was from trees cultivated from these seeds at Toulon that Bonpland, a French botanist, published in 1813 a full description of its characters. His observations contain the statement that he knew at that time about twenty-four different kinds of *Eucalyptus,* and that many more kinds would be discovered both in gardens and herbaria.

His observations of this particular tree caused him to suggest that the whole character of the genus would have to be revised as he had noted the sheath or outer operculum that encased several young buds. As this was admittedly the only species he had ever seen in flower, the character would be impressive. It is now known to be a feature common to many species and therefore of little diagnostic value.

His choice of the name *diversifolia* obviously records his observation of the differences between the leaves of juvenile and mature trees. Here again extended knowledge has found this to be a generic characteristic.

In 1879 the same tree was redescribed by von Mueller under the name *santalifolia,* suggested by "some resemblance" of its foliage to those of sandalwood genus.

The main habitat of the tree is Kangaroo Island and the coastal areas about St Vincent Gulf, South Australia. It has also been found in a small coastal area in western Victoria and in Western Australia.

The species is a small tree or shrub somewhat of Mallee habit—rarely exceeding twenty feet high. The bark is smooth above and rough at the base.

Juvenile leaves are broadly lanceolate and the mature leaves narrow.

About seven flowers on short pedicels form an umbel on a short, terete peduncle.

The fruits are hemispherical with a domed top, above which the valves protrude very slightly.

C. CNEORIFOLIA D.C.

Narrow Leaf

SYNONYMS: E.STRICTA
E.HYPERICIFOLIA

THIS is a Mallee type tree restricted in habitat to Kangaroo Island, South Australia. It forms an important part of the flora of that area and is the source of a large amount of the eucalyptus oil that comes to market.

It was first botanically described by De Candolle at the end of the eighteenth century, and although subsequently redescribed by later investigators under different titles, there is no doubt their descriptions refer to this species, so that under the priority rule it must be credited to the original author.

The specific name arises from the similarity of its foliage to that of the genus *Cneorum*, evergreen shrubs from southern Europe and Maderia.

The tree rarely exceeds ten feet in height. It has stiff, narrow leaves that are occasionally falcate, and that yield about 2 per cent of oil on distillation.

The fruit is either pyriform or nearly spherical, with a thickened rim beyond which the valves protrude slightly. The operculum is hemispherical to pointed and about equal in length to the calyx-tube.

The wood is procurable in small pieces, and serves well for articles required to resist wear and percussion.

E. TORQUATA Lueh.

Coolgardie White Gum

Goldfields Red-flowering Gum

This interesting species was first described in 1897 by J. G. Leuhmann, who coined the specific name in allusion to the warty corrugations that form a collar round the base of the calyx-tube. As the flower ripens to fruit the corrugations become less marked, but still persist sufficiently to form a distinctive feature.

The habitat is practically restricted to a ridge of a few square miles in area close to Coolgardie, Western Australia. There it grows to a height of thirty to thirty-five feet, and as it is in full bloom at Christmas time is often locally known as Christmas Tree. It is a most ornamental tree, and as the flower is profuse and decorative it is of value in garden planting, especially as the tree frequently flowers when two years old.

The bark of the trunk is persistent, dark and scaly, but the branches are smooth and inclined to be ribbony.

The leaves are glaucous, thick, petiolate, and of equal colour on both sides.

The buds just before inflorescence are surmounted by a reddish operculum with a corrugated base and a very pointed peak. The flowers have coral-pink or yellowish-white filaments arising from the red calyx-tube.

E CORNUTA Labill.

Tree Yate

Labillardiere, who accompanied the French expedition of 1791-1794, sent in unsuccessful search of La Pérouse, gathered specimens of this tree, and records that the long horn-like operculum induced him to give it this name.

The species, together with its affinities, *E. Lehmanni* and *E. macrandra*, displays the highest development of this characteristic organ, and marks the upper end of the scale in contrast to the most rudimentary development shown by *E. calophylla* and *E. ficifolia*. Between these two extremes all other eucalypts have opercula of varying orders of complexity.

Cornuta may be distinguished from *Lehmanni* by the concrescent fruit of the latter and from *macrandra* by the flattened peduncle and less acuminate valves of the last.

The habitat of the tree is confined to the south-western corner of Western Australia, where it grows in moist localities to a maximum height of about eighty feet. The type comes from King George Sound.

Young trees have a smooth, yellowish bark, but as the tree ages the trunk becomes covered with a dark grey or almost black bark so deeply fissured as to resemble the ironbarks of the eastern states. The upper stem and branches remain smooth and yellowish in colour, shedding their bark seasonally in long ribbons.

The tree is a fast and certain grower, and is a valuable species for cultivation.

The timber is of brownish-yellow colour, of extreme strength, density and durability. It has a tensible strength of $17\frac{1}{2}$ tons per square inch and wrought-iron 21 tons.

The identity of this species can easily be established by reference to the unopened flowers and ripe fruit.

E. MACRANDRA F.v.M.

SYNONYM: E.OCCIDENTALIS VAR. MACRANDRA

THIS Mallee type tree is found only in a restricted habitat in southern Western Australia, where it forms a thicket of trees not more than thirty feet high. No common name is so far recorded for it. The name was suggested by von Mueller, and the first description appeared in Bentham's *Flora Australiensis* in 1866.

It bears great resemblance in its buds with the long, horn-like opercula to *E. cornuta,* but differs considerably in its habit and fruit.

The bark is smooth and decorticates in small, irregular patches.

The leaves are ovate-lanceolate to lanceolate, thick and smooth, with the veins more numerous and divergent than they are in *cornuta.*

The flowers are greenish-yellow in colour with a very prominent style. About twenty shortly pedicellate florets form an umbel on a long peduncle, which is round or slightly flattened.

The individual fruits are pyriform or semi-ovoid, with a sharp rim and a flat ovary.

On trees cultivated in Melbourne gardens the valves are raised to form a prominent summit, but it is noteworthy that many such species from Western Australia do not fructify readily and the undeveloped fruits persist for many seasons. Connivent valves are a notable feature of such fruits.

E. PLATYPUS Hook.

Moort

Maalok

SYNONYM: E.OBCORDATA

THE type of this species came from close to King George Sound, Western Australia, and was described by Hooker in 1852. The habitat is restricted to southern portions of the state in which localities it forms dense and almost impenetrable thickets.

Whilst individual trees grow to thirty feet high, and are truly arborescent with a single sturdy trunk, its gregarious habit causes it to form a growth that in the eastern states would be known as Mallee and in the West is known as Maalok. This word of aboriginal origin literally means thicket, and is applied to many trees of such habit, often being qualified by adjectives such as black or white. The specific native appellation for this tree is Moort—qualified for our use as round-leaf Moort to distinguish it from the pointed-leaf variety.

The bark of the tree is smooth, thin and flaky, of silver-grey colour. It contains up to 30 per cent of tannin, and is of value as a commercial tan material.

The mature leaves are thick, ovate, ovate-lanceolate or even obcordate.

The umbels are formed of three to seven flowers set sessile on such broad, flat peduncles as to suggest to the author the specific name meaning flat-footed.

The opercula are long and horn-shaped, ranging from as long as to twice as long as the calyx-tube.

The fruits are truncated ovoid to pyriform with a broad rim and exserted valves.

The flowers are generally greenish-yellow in colour but are sometimes dark red.

E. PLATYPUS var. ACUTIFOLIA Hook.

Pointed Leaf Maalok or Moort

This variety of the foregoing species must be regarded with caution, as observation has not yet established the leaf morphology of these trees. The specimen illustrated was taken from a tree grown from seed of a parent cultivated in Melbourne. Parent and progeny are twenty miles apart and in opposed soils and environment yet have similar attributes in all respects. It is possible that with further field-knowledge of the eucalypts of this class this specimen would be referred to *E. spathulata* Hook. or *E. campaspe* Moore.

The tree as cultivated in Melbourne makes fine erect specimens thirty feet high with glabrous, pointed leaves and a trunk covered with a brown bark almost of box character. Above the trunk the bark decorticates in short ribbons, leaving the upper branches smooth and yellowish.

E. LEHMANNI Preiss

Bushy Yate

Bald Island Maalok

SYNONYM: SYMPHYOMYRTUS LEHMANNI SCH.

IT is strange that this remarkable and unique species should not have been recorded until 1845, and then described by Schauer, who took the name recorded by the Preiss herbarium, Lehmann being the author of *Plantæ Preissianæ*, 1844.* The vernacular name Yate or Yeit is aboriginal, and is modified by Bushy to denote a distinction to *E. cornuta*, to which it bears some affinity.

The habitat is confined to Western Australia, where it grows as a thicket shrub or maalok, only occasionally assuming the habit of a tree proper. It has been a most useful and ornamental tree in cultivation in the eastern states and abroad, having adaptability to a range of soils and conditions and, as an isolated specimen, generally grows in a shapely manner and well branched to the ground. It serves admirably as a low windbreak.

Mistake is hardly possible in the identification of the species as the umbels of huge buds on the thick, strap-like, recurved peduncle are unique. The opercula are horn-shaped and frequently $1\frac{1}{2}$ inch long by $\frac{1}{2}$-inch diameter. When the opercula are cast the flower is a sphere of green or greenish-yellow filaments often four inches in diameter. The resulting fruit is curiously aggregated into one mass of perhaps twenty calyces, it being impossible to separate them. The valves are three in number, and characteristically coalesce into the persistent base of the style.

A specimen cultivated in Melbourne, and now twenty years old, has borne flowers perpetually since it was four years old and eight feet high. It is now a symmetrical tree about twenty-five feet high, with a trunk diameter at ground-level of twelve inches.

* Lehmann was of opinion that by reason of its flowers it formed a genus of its own, to which he gave the name *Symphyomyrtus*.

E. OCCIDENTALIS Endl.

Swamp Yate

Flat-topped Yate

Mallet

This species occurs in the southern portions of Western Australia, and over a fair range of climate and soil condition shows such change of habit that several varieties are recorded.

The type was recorded by Endlicher in 1837, and is a tree up to eighty feet high with erect trunk, and branched in such a manner as to give a flat-topped or umbrella appearance. The word "mallet" is a corruption of an aboriginal word spelled "mallert" or "mallat," and owing to the colour of the timber the tree is sometimes known as Brown or Black Mallet.

The lower half of the trunk is clad with tough, fibrous, and almost black bark like *E. cornuta*. On the upper part it is flaky and ribbony, and on the branches it is clean and smooth, of a light-grey or yellowish-grey colour. It is a character of the species that the persistent bark of the base gives place to the smooth bark of the limbs through a transitory, loose, flaky form.

The fruit in the illustration is insufficiently ripe to show the campanulate form with exserted valves that characterize this species.

Three to six shortly pedicellate flowers form an umbel on a long, flattened peduncle.

E. SALMONOPHLOIA F.v.M.

Salmon Gum

This species is of much more stable character than many of its congeners. It prevails in areas of low rainfall in the inland districts of Western Australia where its presence is taken as indicative of good farming land. Throughout the goldfields area it is a welcome tree, providing excellent timber for firewood, mining and constructional purposes. It occurs in open forest growth as an erect tree ranging in height from 60 to 100 feet with a trunk that is covered with a bark of salmon-pink colour. This is sometimes patched with silver-grey, but in most seasons is uniformly and beautifully coloured and of a distinctive waxen or oily sheen. This characteristic polish also extends to the leaves which dry with a waxen surface like the trunk.

The type comes from the head of the Swan River where it was collected by von Mueller and described by him in 1878.

The fruit is notably small and resembles *E. oleosa* with its much exserted valves. Most of the main features are small and delicate as, for example, the young buds and slender, narrow-lanceolate leaves which are usually not more than four inches long.

The umbel consists of six or eight buds shortly pedicellate on a slender peduncle. The opercula are semi-ovoid in shape.

The timber is of interlocking grain and one of the densest of the genus—Baker recording it as weighing 74 lb. to the cubic foot.

The specimen illustrated was taken from trees cultivated in Melbourne and now about ten years old. They have already flowered several times and the small trunks are beginning to show the sheen and colour which give rise to the name of the species.

E. RUDIS Endl.

White or River Gum of Western Australia

Swamp Gum

Flooded Gum

THIS tree occurs solely in Western Australia, the type having come from King George Sound and the species being reported from a large area of the southern and western coastal districts.

The first description was made in 1837 by Endlicher, and the specific name based on the Latin word meaning rough and crude. This is apparently in reference to its timber, which has a local reputation for being worthless excepting for firewood. The common name Wormwood is applied in one locality by reason of its susceptibility to insect attack.

The tree has many features that link it with Red Gum (*E. rostrata*) of the eastern states, but is sharply differentiated by its pale-coloured valueless timber and by its juvenile foliage, which is broad and ovate in contrast to the narrow, lanceolate leaves of young Red Gum.

It is recorded that *rudis* is a short-lived tree, being liable to decay when fair dimension is attained. In the eastern states the many venerable specimens of *rostrata* seem to suggest it as the symbol of strength and longevity, and no timber enjoys a greater reputation for durability.

The bark of the tree is rough, scaly and persistent on the trunk and smooth, grey or white on the branches.

The flowers range from four to eight in the umbel, which has a slender, terete peduncle. The pedicellate buds have a conical operculum which is occasionally rostrate. The line of juncture—or commissure—between the operculum and the calyx-tube is said to be much more definitely marked in *rudis* than in *rostrata*.

The fruits are hemispherical or turbinate, with a narrow rim and three to five cells surmounted by exserted valves.

E. GOMPHOCEPHALA D.C.

Tuart

The Swiss botanist, Augustin Pyrame De Candolle, professor of natural history at Geneva, first published a description of this species in 1828. The name he chose was apt and refers to the "swollen headed" operculum which is such a characteristic feature of this tree. With the possible exception of the Sugar Gum (*E. cladocalyx*), in which the character is but very faint, there is no instance throughout the whole genus of the operculum being of greater diameter than its supporting calyx tube. In the Tuart it is very definitely larger.

The habitat is limited to about 500 square miles of limestone country in the south west of Western Australia. The tree assumes large proportions, growing to 140 feet high and 6 to 8 feet in diameter.

The bark is light coloured, close textured and dense, resembling somewhat the "box" barks of the eastern states. The branches and branchlets are well barked.

The leaves are ovate-lanceolate to lanceolate, darker coloured and shiny above and smooth below. The venation is inconspicuous.

Six to eight flowers are usual, set on a much flattened strap-like peduncle. When cast by the opening flowers the opercula are larger than hemispherical and are slightly ribbed.

The fruits are over half an inch long, globular to campanulate, with the rim flattened and conspicuous and the valves protruding above the rim.

A useful diagnostic feature of the flower—which it shares with *E. regnans*—is the fact that frequently two peduncles will be found arising from the same axil.

The spelling "Tuart" is now generally accepted. It is of aboriginal origin and was formerly spelled "Tewart" or "Tooart."

The timber is of great industrial value. It is pale yellow in colour and of very dense, interlocking grain which causes it to withstand attrition and percussion. It is constantly in demand by wheelwrights and builders of road and rail waggons. It turns well for spindles and tool handles.

E. ERYTHONEMA Turc.

Mount Lindsay Gum

SYNONYM: E.CONOIDEA

THIS is one of the beautiful species that the extreme south-western corner of the island of Australia contributes to general horticulture, for it is a small-growing, rather straggling shrub that has a brilliant and decorative flower. Its habitat is the area about Mount Lindsay, which lies about forty miles north of Albany, Western Australia. It was originally collected there by James Drummond, but was described and named by Turczaninow, the Russian Botanist, in 1852.

The specific name is derived from two Greek words meaning red thread, and evidently has allusion to the brilliant red filaments that make the flower so conspicuous. It was subsequently redescribed by Bentham under the name *condidea*, with reference to its cone-shaped fruits.

It is said to grow to thirty feet high, with a very light-grey smooth bark. In some cases the trunk and branches are whitey-pink in colour.

Its natural environment is sandy country of low rainfall, but it is adaptive and thrives well in cultivation in the eastern states.

Like *macrocarpa* the normal colour of the flowers is red, yet for some so far unexplained reason it occasionally produces flowers with yellow filaments.

The fruit is of distinct shape, being conical and flat-topped, with the valves slightly exserted.

E. TETRAGONA Brown

Mealy Gum
Kalgan Plains Mallee
White Maalok

SYNONYM: EUDESMIA TETRAGONA
E.PLEUROCARPA

THIS is a most interesting and distinctive species with a puzzling nomenclature. Robert Brown, the botanist accompanying the Flinders expedition, published in 1814 in the account of the voyage an illustration and description under the name *Eudesmia tetragona* from specimens gathered in 1802.

In 1827 Robert Sweet, in his *Flora Australasica*, published under the same name a description and fine plate of a specimen grown in England from seeds collected in New Holland by W. Baxter.

The generic name *Eudesmia* was made from two Greek words meaning fair and bundles, referring to the beautiful arrangement of the filaments as displayed by this flower. The specific name *tetragona* remarks the four angles displayed by the branchlets and buds. This peculiar grouping of the filaments was then taken to mark a genus differing from the genus *Eucalyptus*, but no such distinction being now recognized the *Eudesmia tetragona* of Robert Brown becomes *Eucalyptus tetragona*. In 1844 Schauer, the Viennese botanist, published a description of the plant, using the word *pleurocarpa* to denote the species, but rules of priority demand it shall be credited to the original author Brown.

Acceptance of the name *E. tetragona* is confirmed by von Mueller's publication of 1864 and by Bentham in 1866.

The plant itself is curiously interesting to students of the eucalypts as the bundling of the filaments suggests an atavistic tendency to form petals—a character that is shared by a few other western species.

The tree has a fair range of habitat in Western Australia only from the southern coast to the sources of the Swan River. It grows to a small tree of straggling habit, and is prominent by its conspicuous chalky bloom. The branchlets are rarely round, being generally square and even-winged. The angles occur definitely in the bud, and are carried to the fruit as four well-defined ribs.

The tree cultivates well in sandy positions in the eastern states, and is conspicuous and ornamental. On one such specimen a perfectly triangular calyx was found with three corresponding bundles of filaments.

E. PYRIFORMIS Turc.

Ooldea Mallee

Large-fruited Mallee

THIS ornamental and distinctive species is an inhabitant of the arid portions of Central Australia forming part of the political states of South Australia and Western Australia.

It was first described in 1849 by Turczaninow, the Russian botanist, and named by him in allusion to the pear-shaped fruit. The specimen illustrated was grown in a Melbourne garden where such eremophilous species are disinclined to fructify and seed.

In its habitat it is a Mallee shrub or tree twenty feet high, with slender, crooked stems clad with a light brown, smooth bark.

In point of size and ornament of flower it is second only to *E. macrocarpa,* to which it bears some resemblance, but is sharply separated by the form of its fruit and by its distinctly petiolate and smaller leaves. Whereas *macrocarpa* is notable for the heavy bloom covering all parts of the plant, this species displays such feature only on the buds and calyx.

The flowers are frequently arranged in threes, and have notably long, terete pedicels. The resultant fruit is markedly wrinkled, hard, and wooden.

It is a handsome flower, and like other species from the same arid districts appears to bloom unaccountably with varying shades of red or yellow filaments.

E. MACROCARPA Hook.

Desert Gum

Sand Plain Gum

Blue Bush

Rose of the West

This species has the distinction of having the largest and most striking flower of the whole genus. The tree is really little more than a shrub of Mallee type and, although growing to twelve or fourteen feet high, is of such slender and straggling habit as to form no definite bole. It makes a coppice growth of striking appearance as, in the words of von Mueller, the tree is "all over mealy with a whitish bloom."

With its huge rose-red flowers set singly in the midst of the large very glaucous leaves it is strikingly handsome and conspicuous. The flowers are from three to five inches in diameter, and result in hard wooden fruits sometimes as much as four inches in diameter.* The operculum is approximately the shape and size of half a hen's egg.

The habitat of this sensational species is limited to sandy areas about eighty miles N.E. of Perth, Western Australia. In climates not too dissimilar to that of its habitat it cultivates easily and flowers when three to five years old. Trees grown in the eastern states of Australia flower robustly but do not always fructify.

The species was first described by Dr William Hooker in 1842, who coined the generic name in allusion to the remarkable size of its fruit.

* On rare occasions the tree produces yellow blooms. A specimen cultivated in a Melbourne garden had both yellow and red blooms in the same season.

E. PREISSIANA Sch.

Stirling Range Mallee

This is a small but most interesting shrub. The habit is spindly and unshapely owing to the rod-like stems which droop over in scraggly manner.

The first description was made by the Austrian botanist, Schauer, in 1844, from herbarium material in the Preiss collection whose name is perpetuated in the specific title.

In several small areas of the south-western coastal districts of Western Australia the plant occurs, especially on the Stirling Range, where it is known as a Mallee. It is recorded as not exceeding ten to fifteen feet in height.

The flowers are large and of bright lemon-yellow—a colour exhibited in only one or two species of the whole genus. They are of decorative value as flowers, but the untidy habit of the shrubs impairs its use for garden planting.

The large, many-celled fruit can hardly be confused with any other species, and taken in conjunction with the rigid decussate and petiolate leaves makes easy identification.

The specimen illustrated was taken from plants cultivated in a Melbourne garden where they have flowered for many seasons since only a few feet high. The fruits have grown normally in point of size, but have not yet developed to the production of seed.

E. TETRAPTERA Turc.

Synonym: E.ACUTANGULA

No vernacular name is recorded for this extraordinary species.

It was first described by Turczaninow in 1849 in the *Bulletin* of the Moscow Naturalists' Society, and named in fitting allusion to the four wings that characterize the fruit.

Its natural distribution is confined to south-western portions of Western Australia, where it grows as a Mallee or Maalok seldom exceeding ten feet in height.

No painstaking scrutiny is necessary to identify the species. It proclaims its name by the most casual observation of the fruit.

Whilst a few species in the whole range of the genus indicate a tendency to depart from the universal round fruit by occasional faint angularity, this species is entirely square with no suggestion of rotundity. The branchlets are either round or square, the fruit and operculum invariably square with each angle developed to form a wing. At the rim the wing is extended to form a definite hook.

The operculum is pyramidal, its four angles being slightly extended to correspond to the wings of the calyx.

The young buds are wholly green and glabrous, but as inflorescence is reached the calyx and operculum become bright red in colour. The filaments are red at the base, shading to pale creamy pink at their upper ends.

The leaves are glabrous and dark green, devoid of bloom, and exceptionally thick and rigid.

The specimen illustrated was grown in a Victorian garden, where it appeared to be robustly established and constantly flowering.

E. MARGINATA Sm.

Jarrah

E.PEDICELLATA, E.FLORIBUNDA (1837)
E.HYPOLEUCA (1844) E.MAHOGANI (1860)

THIS species was first described by Sir James Edward Smith in 1794 from specimens brought to the Kew herbarium by Archibald Menzies, a collector who accompanied the Vancouver expedition of 1791 on which occasion King George Sound, W.A., was discovered and explored.

The name has allusion to the thickened edges of the leaves which are a helpful but not infallible guide to the identity of the species. The vernacular name formerly used was Mahogany but a laudable desire to lessen the confusion that already surrounded that appelation gave rise to the use of the native name, firstly in the form "Jerrile," subsequently "Yarrah," finally to become fixed in "Jarrah" by which the tree and its timber are now universally known.

The habitat is a coastal belt of 300 to 500 miles in South Western Australia having King George Sound as its western limit and approximating only 50 miles in width. In such places as the species runs inland to the heights of the Stirling Range it degenerates to small trees and shrubs of Mallee type.

Magnificent trees of great dimensions occur on the sandy plains and granite foot-hills, a variation of environment which probably accounts for the varying durabilities of different specimens of the timber. The best and most durable timber comes from trees growing on the granite and ironstone ridges.

The bark is persistent, rough, and fibrous. The mature leaves are lanceolate and slightly falcate, three to five inches long and slightly darker and more shiny above than below.

The opercula are long in comparison with the calyx tubes and are acutely conical and acuminate.

The flowers range from four to eight in the umbel, with the peduncle either terete or slightly flattened.

The fruits are comparatively large, truncated-ovoid or almost spherical; the valves are generally three and are not exserted.

The timber of this tree is of world-wide reputation. It has wonderful endurance above and below ground and under water. When seasoned it is often indistinguishable from Mahogany—being easy to work and taking a high and beautiful finish. Its range of application is extreme, being prized for all uses from structural engineering to delicate cabinet work.

It is popularly supposed that Jarrah wood may be distinguished from Karri (*E. diversicolor*), to which it bears great resemblance, by the colour of the ash on ignition of a splinter. Under certain conditions of combustion Jarrah will simply char to a black ash whilst Karri will oxidize completely to a voluminous white ash.

The tree has affinity to *E. Patens* (Albany Blackbutt) and *E. Jacksoni* (Red Tingle Tingle).

E. DIVERSICOLOR F.v.M.

Karri

SYNONYM: E.COLOSSEA

"ONE of the grandest trees of the globe, and one of the greatest wonders in the whole creation of plants!" Such are the words used to describe this wonderful tree by von Mueller, the author of the species.

Owing to faulty descriptions of botanical features by earlier bushmen, von Mueller temporarily attached the name *colossea* to karri, and under that title much seed was distributed abroad. In 1863 the error was corrected, and the specific name *diversicolor*—derived from the patently different colours of the two sides of the leaf—was relegated to the tree known to the natives as karri.

The habitat is an extensive area in south Western Australia, where trees of enormous size occur. The earlier dimensions quoted have, as in other cases, been much discounted by precise measurement, but accurate figures establish it as one of the tallest trees in the world, only equalled or surpassed by *E. regnans* of Victoria and the *sequoias* of California. Specimens well over 250 feet high with a barrel 100 feet high to the first branch are not uncommon.

The trunk is smooth and yellowish-white in colour, showing darker patches where the outer bark has been shed.

The timber is indistinguishable in the piece from jarrah, and differs only in its failure to endure underground. For structural purposes above ground it is admirable and equal to jarrah. The ash test described under jarrah is used to distinguish the two timbers.

The juvenile leaves are ovate and thin in texture. The mature leaves are lanceolate, up to six inches long, with the intramarginal vein well removed from the edge.

The fruits are pyriform, shortly pedicellate, on long, slender peduncles. They are usually longer and the opercula much shorter than in marginata. The seeds also are much smaller, thus confirming the rough rule that the larger the eucalypt the smaller the seed that gives it birth.

E. FICIFOLIA F.v.M.

Scarlet-flowered Gum

Red-flowered Gum

This species undoubtedly represents the greatest contribution to horticulture that the genus has made. In the seventy years that have passed since it was introduced to the world by von Mueller it has been cultivated in every soil and climate that will suit it. They are many as, apart from a dislike of frosts or tropical heat, it is an adaptable tree and will frequently thrive after a rather lengthy period of establishment.

Its habitat is a very restricted area of about four hundred acres in the south-west of Western Australia. The trees occur as straggling specimens up to thirty-five feet high on sandy ridges. The locality enjoys a heavy winter rainfall and dry summer.

From this limited area have come the seeds to propagate the parents of the thousands of trees the world over that now provide the seed for the steady demand of this tree for garden, lawn, and street planting. The tree is amenable to judicious pruning, and far more shapely and better trees are to be found in gardens than in the natural habitat.

In the flowering season in late summer the tree is covered with a profusion of bloom in all shades of vermillion, red, and scarlet in conspicuous panicles set well above the dark green foliage.

The author of the species in his *Eucalyptographia* explains that "the specific name of this gorgeous tree was chosen before the brilliancy of its flowers was known and alludes to the similarity of the leaves to those of fig-trees of the series of *Ficus elastica*."

The species may be easily recognized by its dark green leaves with transverse veins and pale, dull under-page, and by its large ovoid or urn-shaped fruits. The operculum is peculiarly small, membranous, and rudimentary. These characters are shared by *E. calophylla* which bears close affinity to *E. ficifolia*. Conclusive identity can only be made by referring to the seeds, *ficifolia* having small amber-coloured and winged seeds and *calophylla* large black and wingless seeds.

E. CALOPHYLLA R. Br.

Marri

Red Gum of Western Australia

Of all the eucalypts exclusively endemic to Western Australia this is probably the best known and most abundantly planted outside the boundaries of that state. It is a tall, handsome and spreading tree, reaching 100 feet in height, with a trunk diameter of six feet or more.

Reference to it was first published in 1832 by Robert Brown, who gave the specific name in allusion to the similarity of its leaves to those of the genus *Calophyllum*, which in turn was derived from Greek words meaning beautiful leaf. The vernacular name of Red Gum has caused some confusion, and alludes to the quantities of red kino that the bark exudes and that also appears in veins in the wood. The name Red Gum being almost universally and exclusively applied in the eastern states to *E. rostrata*, on account of its red timber, an effort is being made to suppress its application to *calophylla* and replace it by the native name Marri.

The habitat of this most ornamental tree exceeds the range of the karri and jarrah forests of southern Western Australia. It occurs interspersed with these species as a forest tree and as isolated specimens in open country.

It has economic value in providing a pale-coloured timber whose full usefulness is marred by the prevalence of gum-veins. The kino exudate from the bark would have high value as a tan material were it not for its red dyeing qualities.

The bark is flaky, rough and persistent. In young trees it is tesselated and box-like in appearance.

The leaves are broadly lanceolate, dark green in colour above, pale and dull below, with numerous transverse veins. They contain the minimum amount of essential oil, which is indicated by the almost complete absence of oil-dots in the leaf.

The flowers are large, white, and prominently arranged in panicles above the foliage.

The operculum is small, membranous, and rudimentary compared to all other species.

The fruit is urn-shaped and notably large in comparison with the calyx from which it is formed.

Calophylla bears great affinity to *ficifolia*, and like it is a valuable garden, plantation, and street tree. It may be distinguished by its more vigorous growth, larger size, and black wingless seeds.

E. CALOPHYLLA var. ROSEA J.H.M.

Pink-flowered Marri

This most ornamental and sought-after variety has an obscure origin. In all its characters save the colour of its flowers it coincides with the type.

In 1893 a single specimen of *E. calophylla* in cultivation in the Melbourne Botanic Gardens flowered with deep rose-pink blooms. Seeds from that individual have been widely distributed and cultivated, and whilst some have flowered true in colour to the parent tree many have reverted to the normal white of the type, and some have produced intermediate shades of colour. It is by no means certain that this popular "pink-flowering gum" will breed true to colour, and that even should its first flowers be true, that they will remain so. Instances of loss of colour with successive flowering seasons are numerous; conversely cases of accession of colour are well authenticated. Whether such variations be due to cross pollination, soil influences, or environment is not yet determined.

It is reported that in the Bridgetown district within the natural habitat of the tree a form with pink flowers occurs. These trees may have been the parents of the original pink-flowered tree cultivated in Melbourne which has been erroneously described as *E. ficifolia* var, *Guilfoylei,* and more correctly as *E. calophylla* var. *rosea,* hort.

E. MEGACARPA F.v.M.

Bullich

Blue Gum of Western Australia

The habitat of this tree is restricted to the south-western portion of Western Australia where, in 1802, it was recorded as a Blue Gum by Robert Brown, botanist to the Flinders expedition. It was not till 1860 that von Mueller published a complete description of its botanical features with a specific name chosen in allusion to its comparatively large fruit.

It is a definitely well-marked species, and by its fruit and habit easily identified. Judged by its fruit alone, its closest relative in the genus is *E. Preissiana*, but the latter has yellow flowers and is never more than a straggling shrub, whereas Bullich has creamy white flowers, and attains a height of eighty feet and a trunk diameter of three feet.

The trunk is characteristically smooth and blue-white in colour, becoming seasonally marked with white or yellowish patches where decortication has taken place.

The tree prefers swampy lands, and can thrive in places where water persists the whole year round, but it is also adaptable to cultivation in comparatively dry localities. In its habitat it ranges to elevated positions, where it assumes a Mallee growth and produces notably larger fruit.

The buds are large, smooth, and surmounted by an operculum that is at times peculiarly flat, but more often bluntly conical and umbonated.

The flowers are large and decorative, and form attractively-shaped fruits that usually have five distinctive recessed valves, less frequently four or six.

It is an ornamental and satisfactory tree to cultivate in a considerable range of soil and climate.

E. LONGICORNIS F.v.M.

Morrel

Red Morrel

Synonym: E.oleosa var. longicornis F.v.M.

In 1878 Mueller briefly referred to a tall tree in Western Australia that had much resemblance to his *oleosa*—a characteristic Mallee occurring in the drier areas of all the mainland states. He suggested it be considered a variety of that species, and used the qualifying title *longicornis* in reference to the "long-horned" opercula that were a distinctive feature. The height of the tree (60-80 feet), the bark, timber, opercula and fruits show such differences to the type that Maiden acclaimed it a species in his *Critical Revision*, in 1919.

The oil-content of the two trees is remarkably alike both in yield and constitution.

The species is confined to western portions of Western Australia, and is known to extend from the coastal areas to Kalgoorlie.

It is known locally by the aboriginal name Morrel, and qualified as Red Morrel on account of the colour of its timber.

The bark is persistent on the trunk, dark grey and closely fibrous. On the branches it is reddish-grey, thin and smooth.

The leaves are narrowly lanceolate and glabrous, containing many oil-dots.

Up to nine buds with long, horn-like opercula form an umbel on a long, slender, terete or slightly angled peduncle.

The fruits are small and semi-ovoid in shape, with a decided rim. The valves are much exserted and coalesce in the style in decided contrast to those of *oleosa*.

E. NUTANS F.v.M.

Laurel Gum

In the first edition of the *Anthography* (1920) this illustration was recorded as *E. obcordata*, a species described by Turczaninow in 1852 and figured and described by Mueller in his *Eucalyptographia* of 1879.

It is now recognized that Turczaninow's *obcordata* is synonymous with Hooker's *E. platypus*, and the latter, being earlier in point of time, takes precedence.

The illustration was made from a specimen (now destroyed) cultivated in the Melbourne Botanic Gardens, and as it has differences to *E. platypus* it is now referred to von Mueller's *E. nutans*. The latter was described in 1863 and named in allusion to the "nodding" appearance given to the blooms by the curved peduncle.

The type comes from a limited coastal area in subtropical Western Australia, where it is stated to form "impenetrable thickets."

It is possible that further investigation will prove that it is an aberrant form or variety of Hooker's original *E. platypus*.

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[In botany, the convention is to write generic names with a capital letter (e.g., *Eucalyptus*) and to use only the initial letter when the name of the genus is clearly understood, as in the matter on pages 7-12 and in the descriptions of the plates. Specific names should begin with a small letter (e.g., *E. acacioides*) except when derived from the name of a person (e.g., *E. Macarthuri*). Both generic and specific names are usually printed in *italic* type when they occur in a sentence; but in tabular form (as in an index) or when displayed in headings (see descriptions of the plates) the convention is frequently departed from for the sake of appearance.]

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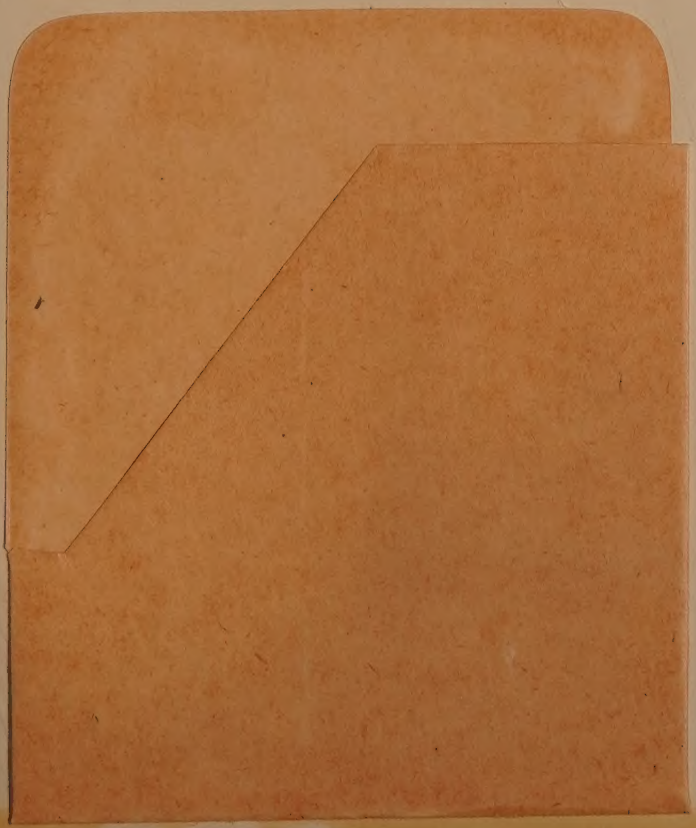

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